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ABSTRACT

These proceedings contain summaries of the panel discussions and workshops as well as texts of the individual papers and reaction papers presented at a conference that focused on key issues of concern to educators and industry involved in the education and training of agricultural machinery technicians. Addressed during the conference were the following areas: the role of industry in agricultural mechanization education; recruiting and providing quality postsecondary instructors and keeping these same instructors technically and educationally competent; the goals and problems of curricula at the secondary, postsecondary, and university levels; interfacing agricultural mechanization programs and ways in which schools and industry can cooperate to resolve problems associated with on-the-job training; funding strategies and funding sources; and future challenges and opportunities for educators and industry. The appendices include lists of the planning committee, participants, workshops and the conference agenda. An author and a subject index of papers and reports is also attached.

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Proceedings

INDUSTRY AND EDUCATION... PARTNERS IN AG MECHANIZATION

JOHN DEERE

1-2-3 November 1982

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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"We have a challenge to develop a strong partnership which may be so very important to the success of industry and education in the years ahead. That partnership must be established in the spirit of trust and cooperation during this conference and continued hereafter until mutual goals are achieved."

William Schreck
Head Consultant
State of Illinois
Staff Ag Occupations
Springfield, IL

SYNOPSIS OF CONFERENCE

(An Abbreviated Overview of the Key Issues and Events)

Few would question that it is becoming increasingly more difficult to develop a technically competent service workforce. This is certainly true in the field of ag mechanics. Many have become involved in attempts to find solutions; implement dealers, vocational schools and even equipment manufacturers. Unfortunately, these efforts, while well intended, were often not well coordinated.

Deere, like others, has been involved in the furtherance of vocational education for many years. Because of its continuing concern and the preception of expanding needs, Deere offered to sponsor and host a conference which would bring together those major elements which could influence change—educators, dealers, and industry. The goal of this conference was to identify those key issues which were of mutual concern in the education and training of agricultural machinery technicians. The long-term goals are to increase both the quantity and quality of these technicians to the ultimate benefit of machinery dealers, their customers, and to the machinery manufacturers.

The conference focused on the post-secondary level of education, but included discussions on secondary and university levels as well. While many of the topics of major concern were predictable, others were largely developed through the interactions of the participants at this conference. The enthusiasm for the conference and the subject matter was readily evident by the level of participation.

KEY ISSUES

The following list outlines some of the significant discussions that ensued during the conference:

- *The struggle for keeping instructors technically and educationally competent.*
- *Difficulties in recruiting good instructors.*
- *Insufficient rapport between dealerships and schools.*
- *Inadequate educational support by dealers.*
- *The lack of well-educated technician graduates.*
- *The formidable task of recruiting students for the post-secondary ag mechanics curriculum.*
- *Problems in funding the technician's education.*
- *Unorganized communications and undefined goals.*

This discussion includes only a few of several significant points; for more details refer to the "Summary of Conference Activities" or the individual papers and reports. Here are highlights that describe some of the topics.

Keeping Instructors Competent

It was generally agreed that keeping instructors technically and educationally competent is a most challenging task. There is considerable variation (and disagreement) among states and individual institutions on who has the responsibility for the technical competence of post-secondary ag mechanics instructors. Some universities are not providing necessary technical education for these instructors. Further, some universities do not recognize nor give college credit to

instructors attending workshops (service schools) held by industry. While the instructor is expected to be technically knowledgeable, in some cases this becomes the instructor's sole responsibility — just an extra credential that is neither provided nor recognized appropriately. It would appear that much can be done in each state to better define roles and responsibilities for the establishment of qualifications for vocational instructors and their educational needs. Some conference participants also said that post-secondary school administrators need to provide support for instructors to attend industry service schools to keep up-to-date.

Difficulties in Recruiting Good Instructors

Competition with industry was one of the main points of this discussion. Industry employs market representatives with education and technical background similar to that of the ag mechanics instructor. Industry's salary is usually higher than schools can afford to pay; consequently, industry gets many of the highly qualified people.

Rapport Between Dealerships and Schools

There is often a significant misunderstanding in dealer expectations of a newly trained ag mechanic and the objectives and capabilities of the vocational school. It was suggested that dealers need to become more involved with local schools by establishing communication, participating in curriculum planning and sitting on advisory boards. Also dealers should assist in recruiting students by sponsoring scholarships and by visiting high schools and talking to students.

Educational Support by dealers

Several comments suggested that dealers can be valuable to schools in providing direct assistance in their educational programs. Dealers can help keep instructors and students up-to-date on the latest changes in technology. Dealers can help schools obtain educational components by loaning, donating or selling at a discount. Dealers can also provide opportunities for meaningful on-the-job training.

Well-Educated Technician Graduates

Workshop groups and individuals agreed that the technician graduate must know the basics of technology, have diagnostic skills, be able to read well and have acceptable math skills. It was suggested by some participants that the technician graduates are not prepared for the entry-level requirements of the job.

Recruiting Students

Recruiting students for a career in ag mechanics is becoming more difficult as indicated by those addressing this topic. The image of the technician in the minds of some people is a poor one. The technician is not appreciated for what he or she must know. The wages paid to technicians are low compared to "non-skilled" assembly-line labor with only a high school diploma, but the machinery technician must have two more years of school.

Funding of the Technician's Education

Everyone agreed that it is expensive to educate and train the ag machinery technician. One of the reasons given is that classes must

be limited to 10 or 15 students for effective instruction, while by contrast, classes in the academic pursuits can have 25 to 30 students. Not only is there a significant difference in tuition income per class, the cost of equipment and facilities is also much higher for the technician curriculum. Funding sources are often limited to tuition and available state funds.

Communications and Goals

It was discovered by conference participants that poor communication exists between industry and the education community as well as between educators themselves. This lack of communication has been a significant deterrent in the development of a well-coordinated, highly effective vocational education program. It was felt by many participants that good ongoing communications and cooperation between education and industry will help establish the goals and objectives necessary and result in much needed progress in this field.

A BUDDING "PARTNERSHIP"

The emotional atmosphere that existed during these sometimes controversial discussions was both surprising and exciting. While it was evident that some did not always agree with what was being said, no one was angered by argument or intimidated by fear of retaliation. While all sides received constructive criticism, no one seemed embarrased or humiliated. The participants handled opposing views in a professional manner, knowing that the ultimate outcome would be beneficial to all.

These proceedings will show that this conference was an effective forum for airing major issues, for serving as a catalyst for cooperation and for establishing a renewed effort by educators and industry to fulfill mutual goals through a "partnership" of commitment.

There is no question that this conference broadened the understanding of each of the participants toward the need for greater communication and cooperation. It also developed a measure of enthusiasm and comradery which will serve to maintain a momemtum for further progress. In response to a concluding evaluation question — "What will you do with what you have learned here?" — Larry Case, State Director of Ag Education, Missouri echoed the sentiment of several- . . . . "Plan in-service educational activities with business and industry for teachers in our state. I will also try to utilize more industry representatives in our decision-making process." (Many others suggested that more such conferences should be held in other parts of the country. Some suggested mini conferences would be very effective.)

This conference was a success because everyone involved was dedicated to its purpose. Deere is proud to have been its host and we thank the participants for their efforts and support.

Louis R. Hathaway
Conference Chairman
Deere & Company
Service Training Department

HOW THE CONFERENCE WAS ORGANIZED

Planning Activities

The detail planning of the conference began in November 1981, one year before the conference was held. A planning committee was established consisting of three Deere people and five educators. The initial task involved the definition of conference objectives and parameters, some thoughts on the conference structure and the identification of major topics. Work was also begun on the involvement of key individuals, selection of subtopics, and of course financial arrangements. Two and one-half days were set aside in October or November 1982 for this event.

Conference Participants

The number of participants was limited to 100 so that the conference could be structured in an effective workshop format. Five midwest states (Minnesota, Wisconsin, Iowa, Illinois and Missouri) were selected in order to avoid expensive travel for participants. Conference attendees were sought by invitation only in order to secure a well-informed but representative cross section of educators from each state. The list included university ag mechanics department heads and teacher educators, post-secondary administrators and instructors, secondary instructors and state department of education representatives. The actual participants represented 30 community colleges or vo-tech schools, 13 universities, 5 high schools and 5 state departments of education.

Structure of Conference

The planning group decided that, while we would have speakers and panelists, the primary structure would be in the form of workshops. This conference was to be a participants' event, not a spectators' event and everyone was assigned one or more of the following responsibilities:

- Session Chairmen
- Workshop Chairmen
- Speakers
- Panelists
- Reactors
- Recorders

The conference was held at two locations — the Deere & Company Administrative Center and the Sheraton Hotel in Rock Island, Illinois. Opening and closing sessions with some of the presentations by principal speakers were at Deere & Company and the workshops were held at the Sheraton. A copy of the conference agenda appears on page 229 of the appendix.

Finally, it was the intent of the planning committee that this conference be well documented. These proceedings are the result. Therefore, all speakers were asked to submit a copy of their prepared presentations for this report. Others who had responsibilities as reactors, recorders, session and workshop chairmen were also asked to commit their summaries or presentations to writing. These too are a part of this record. Distribution of these proceedings will be made to all participants and to others who have strong interests in this subject or are in a position to influence progress.

PRESENTATIONS BY DEERE EXECUTIVES AND KEYNOTE ADDRESSES

While several Deere executives were involved in this event, it was the pleasure of the participants of this conference to be addressed by a different executive each of the three mornings the group met. The first day of the conference, Mr. Robert A. Hanson, Chairman, President and Chief Executive Officer, greeted the conference participants. This was followed by a joint keynote address by John A. Conrads, General Service Manager at Deere & Company and Larry Statler, Assistant Dean Agribusiness and Farm Manager at Kirkwood Community College, Cedar Rapids, Iowa. With these openings, the conference was off to an enthusiastic beginning.

Mr. Willard L. Stowell, Director of Sales Branches, and Mr. Fred W. Thorne, Director of Marketing Services, addressed the group and opened the day's activities on Tuesday and Wednesday mornings respectively. And last but not least, Mr. Curtis W. Tarr, Vice President of Management Development, provided an inspirational message following a banquet at Deere's main dining room on Tuesday evening. Since this was an extemporaneous presentation and it was not recorded, its contents do not appear here. The remaining presentations follows.

EXECUTIVE ADDRESS BY DEERE & COMPANY

CHAIRMAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER

ROBERT A. HANSON

Ladies and Gentlemen:

Welcome to Deere & Company and this Educators' Conference.

I understand this is the first such conference that has been sponsored by a farm equipment manufacturer. It gives me great satisfaction that this conference should be sponsored by Deere & Company, but I am even more encouraged by your eager participation.

You have chosen a most meaningful theme for your conference: —

"Industry And Education — Partners In Ag Mechanization"

We realize that the rapidly growing technology of our modern machinery cannot be kept intact by untrained technicians. The days of the self-made technician are drawing to a close at a rapid pace. We must, therefore, make sure that we have well-trained technicians in the field. We never want to see the day where our ability to design and manufacture products outstrips the ability of technicians to properly service the product.

Therefore, we are committed to support the ag mechanics activities of vocational training schools and junior colleges. We are also asking our dealers to support your activities on a local level.

We have even gone a step further. Upon the request of Mr. Boyd Bartlett, Senior Vice President of our Farm Equipment Division, the Board of the Farm and Industrial Equipment Institute passed a resolution that endorses the education and training of people in farm mechanization.

Allow me to read the resolution: —

"Be it resolved that the Farm & Industrial Equipment Institute strongly supports education and training of persons at community colleges and vocational technical schools in the general field of agricultural mechanization. The graduates of these programs often become valued employees of dealerships and are essential to maintaining the productivity of agriculture and the construction industries. Further, we strongly endorse and encourage representatives from our member companies to continue to serve on the boards of the schools, help recruit people to attend, provide or assist in obtaining training materials, actively seek public endorsement of the agricultural mechanization programs, and to promote funding (private and government) of these schools, as a means of providing technically qualified manpower to fill the many job opportunities afforded by our industries."

We have informed our management and our dealers of this resolution, and have strongly urged them to support your activities on a national and local level. We believe that other member companies of F.I.E.I. have also encouraged their management and dealer organization to support you.

We consider this endorsement a real milestone in our efforts to help our dealers maintain a well-trained and effective staff.

This conference is our contribution, and a tangible sign of our commitment to the agricultural educational community. You can count on the continued support of our Company units and our dealers.

You have designed an interesting and ambitious program for the next three days. I just know you will leave here with a real sense of encouragement, enrichment, and achievement.

I'm glad we are facing tomorrow's challenges as partners. Together we will master them.

KEYNOTE ADDRESS BY DEERE & COMPANY

GENERAL SERVICE MANAGER

JOHN A. CONRADS

Ladies and Gentlemen:

The history of this world has been punctuated by major events . . . the Great Flood . . . the discovery of America . . . the Civil War . . . two World Wars . . . the invention of the automobile . . . and a multitude of other events that conjure up many things in our minds.

Then there was the launching of the Soviet space vehicle, "Sputnik", on 4 October 1957. More than after any other event did Americans question where they were going. We questioned the effectivness of our educationals system . . . we questioned our commitments to research . . . we even questioned our leadership role. It is to our credit that this event resulted in an accelerated space program that lead to placing a man on the moon. I want to mention this event because it appears to be a meaningful parallel to our conference.

On 20 July 1969, Apollo 11 touched down on the moon. Neil Armstrong emerged and the following message was flashed back to earth:-

"That's one small step for a man,
one giant leap for mankind."

The excitement of space exploration has died down, but the world has not been the same since because advanced technology is both inspirational and mind-boggling.

In some real way I look at this conference as a small step for each of us - yet it can be a giant leap for the educational community and our industry. To the best of our knowledge, this is the first conference of its kind. We are treading on uncharted territory, but we have started to venture out . . . that's the important thing. The beauty of it is the recognition that the task is too great for any single entity. The Ag equipment dealers can't do all the necessary training - the agricultural machinery companies can't do it all - even our educational institutions and our vocational schools can't do it on their own.

To put a man on the moon required a maximum of input from almost all disciplines of our great industries, research centers, and engineering schools. A similar effort is, no doubt, required to make consistently effective Ag-technician programs the reality in this country.

We pride ourselves in sending a larger percentage of our high school students to college than any other industrialized nation in the world. That is a marvelous achievement, and we can be justly proud of it. Yet knowledgeable people like Peter Drucker point to the other side of this picture by saying "only a very rich nation can afford this type of an educational system, because we educate too many and train too few." This statement becomes rather dramatically relevant when we consider that 20% of the adult American population is functionally illiterate. It becomes even more relevant when we consider that it has become easier to find and hire a graduate engineer than a qualified technician.

We have to realize that we are the only industrialized nation in the world that doesn't have a government mandated vocational training or apprenticeship program for skilled trades. The trend toward ever higher levels of technology in present and future products, or course, raised new doubt about the ability of self-made technicians to service complex systems.

We must ask ourselves if there is something wrong in our system that allows this to happen. Let's explore this for a moment. I believe it might be well if we would recognize that many jobs held by college graduates do not require the educational background normally acquired in a four-year college program. In many cases, a person with a high school diploma and two years of special training at a junior college or vocational school could be a better candidate. . . and find more satisfaction than would a college graduate, who may become bored.

On the other side, we have the technician who is poorly educated and also untrained for the task of repairing today's high technology equipment. All too many employers have the strange notion that a technician is a person that somehow has the special endowment from his creator that he can just pick things up in the process. . he learns through his fingertips. . . in other words, he doesn't require training. Obviously, nothing could be farther from the truth - and in this case the brain, not the hand, is the "heart" of success.

I am fully aware that it is a great challenge to make meaningful adjustments in the way we educate and train people to become effective, efficient, and relatively satisfied members of the nation's workforce. But, we must make the commitment and expend the effort to start the process and then keep it going. . . at all levels and in all parts of the career technician's training programs.

I believe the time has come when all of us have to recognize that competence must exist in any profession. That includes the agricultural technician - and we must consider the job of the technician a profession. We have to view him/her as a vital link in the process of agricultural mechanization. The well-trained and skilled technician must receive the same kind of recognition and monetary compensa-

tion that other skilled citizens enjoy. We (industry, dealers, customers, and educators) must convey the sentiment that the technician's profession is a valuable one. I believe that an approach like this will make the Ag-technician profession desirable enough to motivate young men and women to spend a couple of years in such a program for their own good . . . and ultimately the good of our agricultural society! Agricultural machinery dealers, junior colleges and vocational schools need to convey this message to qualified high school students at the local level. Educational institutions have to assure that future technicians are trained on modern equipment by modern methods.

And then, it is industry's role to support those activities by sharing its knowledge and by providing training materials and components at affordable prices. Lastly, it is the dealer's responsibility to support local training programs and offer employment opportunities to the graduates.

We believe that this conference is designed to point us into the right direction. It's a small step for each of us, but it can and should be a giant leap for the agricultural community. To that end, let's join our hands in the spirit of true partnership.

PARTNERS IN AGRICULTURAL LEADERSHIP - PAL

BY KIRKWOOD COMMUNITY COLLEGE

Assistant Dean Agribusiness and
Farm Manager Lary L. Statler

I. **INTRODUCTION:**

A. "Do we come with the solution, or are we a part of the problem?"

B. There are those who believe that cooperative attempts at education merely raise the budget being born by an already over-extended customer/farmer.

C. Our ultimate contribution will probably only be positive if we can do our part in raising the productivity of our agricultural workers.

D. For purpose of this address, I'd like to define productivity in the language of "Labor Recovery" = The actual percentage of an hour that a worker is receiving a salary where he/she is returning merchandisable output to the employer.

E. At Kirkwood we instruct our students that there are many reasons whey the "Labor Recovery" of a particular worker might be below average:

1. unnecessary illness and lateness
2. lack of knowledge - poor technical techniques
3. unnecessary work delay due to breakdowns and poor weather planning
4. poor communications systems requiring the appropriate parties to sit down and share ideas
5. mental lapses, wasted steps, personal reasons
6. shortage of supplies - not having adequate quantities of supplies around you. Purchasing in too small of quantities.

F. Our future, both education and agribusiness and industry, lies in the goal of enabling our students and our workers to raise their percentage of "Labor Recovery" That enables the worker to make a more sufficient salary without neces-

sarily forcing the employer to pass an even higher service charge to the customer. **PUT ANOTHER WAY, IF WE CAN DO MORE PRODUCTIVE WORK WITHIN A WORK PERIOD, EVERYBODY WINS** the workers, the employer, and the customer-ultimately the consumer and the community.

II. **Body:**

A. Perhaps we should look at some basic characteristics of vocational agricultural education (high school or post-secondary):

1. Relativity improves learning by increasing motivation.
2. The opportunity to gain experience with the lesson being learned provides an instant evaluation process.
3. If a student can invest his/her own time or money in a lesson or a job, interest is greatly increased. The "project" of the student has long been a good instructor.
4. Goals which are set by and for an individual are the most meaningful to the individual.
5. Skill development is more beneficial to the individual if he/she feels like there is personal development in addition.

B. John Conrads described the efforts necessary for our country to succeed in the "Moon Mission." As he talked, I was thinking of the necessary "team work" to make that goal a reality. If we are quite honest about it, **there are very definite players on our team, too**:

1. The students = NPASO — explain National Post Secondary Agricultural Student Organization.
2. The employers = John Deere — has always been a leader.
3. The professional teachers association = NVATA — explain it.
4. The institutions = Universities, secondary schools and technical and community colleges.

C. I presume that the origin of this conference has at its roots the assumption that there may be a "gap" somewhere in this educational technology that we are all caught up in.

1. The existence of a "gap" is not all that bad. The important thing is that the "gap" can be measured - specifications of it must be determined so that the proper mechanical care and maintenance of it can be provided.
2. I have a unique opportunity at the local level to work with all aspects of the educational technology community. For sure, there are problems in the area, both cosmetic and real.
3. Let's study, for just a moment, some of the unique aspects of the situation:

See Exhibit 1

D. Recently, I have been thrilled to work with a project called PAL/PEER. John Spuller, a Deere and Company representative, is present at this conference and has been VERY instrumental in assisting in the project of which Deere and Company has become a pioneer sponsor. I think that, as the NPASO Board of Directors has worked with potential sponsors, much as been apparent:

1. What is PAL/PEER?
2. How did PAL/PEER develop?
3. Our experiences:
   - There is interest at all levels.
   - Funding does not seem to be an issue.
   - There is a real willingness to cooperate.
   - There has not been an integrated and articulated plan of cooperation—at least a plan that could be communicated with a price tag.
   - There are many well-run and skillful projects being conducted at the local level but others do not know about it. (Particularly within companies or institutions.)
   - There is a certain close-mindedness to the need for the projects to be shared—maybe a bit too much self-preservation is associated.

III. **SUMMARY:**

A. Certainly, the communities continue to look to Deere and Company for the new leadership—obviously, it is being provided.

B. Good education (vocational agricultural) is a "partnership affair." (Experience—real life—established goals—all are a part)

C. There truly are four separate, yet similar, players on the team (students employers—teachers—institutions) none should be forgotten.

D. We do need to identify our challenges. These "gaps" become the actual game we are playing in.

E. Finally, I think we would all agree that we can be part of the solution and not the problem, only if we can cooperatively work at raising the base productivity of ourselves as workers. Conferences such as these do that very thing, because by bringing the proper parties together for a short period of time more actually productive work can be done in a reduced time frame.

EXHIBIT 1

CHARACTERISTICS OF THE "EDUCATIONAL TECHNOLOGY" GAP

Both Students and Instructors	Both Employers and Institutions
1. Different professional and experience backgrounds.	1. Difficulty in quantification of employment needs.
2. Different professional and personal interests. Each is very much specialized.	2. Difficulty in communication of employment needs outward and upward.
3. Due to both of the above, there exists a different need for pre-enrollment activity.	3. High technology means high cost. (of equipment and adaption to the higher technology initially but can become more efficient)
4. Different professional needs after employment has begun.	4. Frequently, the wrong amount of budget exists at the wrong level.

EXECUTIVE ADDRESS BY DEERE & COMPANY

DIRECTOR, SALES BRANCHES

WILLARD L. STOWELL

I am indeed pleased to have been invited to address this select group of educators.

The importance of a conference such as this cannot be overstated. The fact that we did not hesitate to sponsor this program in these depressed economic times should send a clear signal to you and your colleagues that Deere is committed to the concept of education and training. It's the only way to assure a supply of trained technicians who can give proper service on our products...and, for that matter, on our competitors' products.

As we look at the products that are in the design stage, and then look even farther ahead to the products that we are conceptualizing, we must ask a very probing question--who will service these complex and highly productive machines? Can the dealer service organization keep these machines running to the customer's satisfaction?

The next decade will see manufacturers preoccupied with building products that will conserve energy and will operate with greater efficiency. Then, there will be the greater application of electronics on a broad front. In short, we are approaching a new generation of farm machinery. Electronics — "black boxes", if you please — will dominate the farm scene...not only on machines, but on the farmer's desk, in the hog pen, on the feedlot, etc. Electronics will be a revolution not unlike the introduction of hydraulics in the sixties. It has taken more than a decade to make farm equipment technicians familiar and comfortable with hydraulics. That's a long time.

Frankly speaking...nobody can afford that kind of a learning curve. Farmers can't afford long downtime. It's a challenging position in which we find ourselves, and we need your help.

I agree with the observations made by Mr. Bob Hanson during his opening remarks that the age of the self-made technician is probably over; people need intensive training to competently service today's complex farm machinery.

Now...we are not trying to dump the entire responsibility on the academic community. We believe that manufacturers and educators have rather unique individual tasks to fulfill.

Let me give you a glimpse of our own service training efforts.

The first level of training is conducted at the factory level. The training is directed at our own Area Service Managers — those people who support our dealers in their service efforts. In the past year, we provided a full 5,000 student/days of training. That's about 20 days of training for each Area Service Manager.

The next stop is the training process aimed at our dealer personnel. Formal service training is conducted in eleven training centers that are strategically located around North America. Additional training centers are located in numerous foreign countries. During the past five years we provided training to an average of 11,500 dealer technicians in North America annually, or roughly 30,000 student/days of training per year. In addition to this training at our training centers, we conducted short courses in the field. Also, a growing number of dealers provide in-dealership training for their technicians. This activity is greatly aided by Deere's Pathfinder Slide/Audio Service Training material.

Obviously, the training we provide is directly focused on Deere products.

We believe that the role of the educational community is to teach mechanical and technical concepts on which a future technician can build a career in ag mechanics. In other words...we ask you to lay a solid foundation by using modern methods and up-to-date equipment — and by training people to fill identified needs in the agricultural service industry. We also challenge you to work closely with your local agricultural dealers to gain their support and to stay in touch with the changing demands. This should also help you in placing your graduates in meaningful and fulfilling jobs. You would also open channels of feedback on the peformance of your former students.

We believe our cooperative efforts will be of mutual benefit and result in the assurance that modern farm machinery will be serviced expertly.

We are partners in this process. Our individual activities can, and should, complement each other...and with proper communications, they will.

I am proud of this partnership. It assures a better tomorrow...for all of us.

EXECUTIVE ADDRESS BY DEERE & COMPANY

DIRECTOR OF MARKETING SERVICES

FRED W. THORNE

Ladies and Gentlemen:

This is the final day of your conference. You have listened to speakers ... you have participated in workshops ... you have met people in formal and informal settings ... you have contributed to this conference in many different ways ... and you have probably also formed some preliminary opinions about the benefits of this conference.

This afternoon most of you will be traveling home. Tomorrow morning you will face your regular tasks. We are sure, however, that your outlook on the needs for training young men and women in agricultural mechanics will have been influenced by what you saw and heard at this conference. There is a somewhat shopworn American adage that says: "Usually when it's all said and done ... more has been said than done."

We are realistic enough to realize that one conference is not going to drastically change educational approaches ... This conference will not magically convince our dealers that they should emphatically support vocational education and hire your graduates ... this conference will not automatically extract additional funds from state and local treasuries.

Yet, this conference can be a very encouraging and far-reaching beginning of a new approach to an old problem.

I have noticed that some of the John Deere speakers have briefly touched on the word "commitment." I believe it would be well for us to consider the importance of commitment. Obviously, John Deere has demonstrated a degree of commitment by sponsoring this conference. We don't intend to stop there. We will keep going and we believe that our dealers will join hands and commit themselves to the promotion and support of vocational training. We believe that you, as the nucleus of the vocational training community, will also go away from here with a new resolve to address the importance of training the future agricultural machinery technician. And then we believe that young men and

women in the cities and towns you represent will see the benefit of taking two or three years of their life to get in-depth training that will lead to a satisfying and profitable career. As you see, it takes commitment on the part of many people.

The opposite of commitment — in my perception — is lip service. My definition of lip service is "just merely talking about the subject." Heaven knows, there's enough of that going on.

Commitment is when "it hurts just a little bit."

The pursuit of any worthwhile endeavor will call for some sacrifice. The subject of vocational training is no exception.

Today you will specifically discuss the matter of funding. Without proper funding, all of the best-laid plans will ultimately be futile. Funding of any program is true commitment. We believe we can expect you to be good ambassadors for a worthwhile cause. We believe that you will make that extra effort to have your boards understand the importance of a bona fide ag-mech program. Your enthusiasm may well sway the minds of the authorities who cast the final votes when allocation of funds id decided upon. We know that this is a tough — but most worthwhile — task. We believe we can pull it off.

We are certainly proud of this fine group of educators assembled here. Your joint commitment can, and will, make a difference — not only in the schools and colleges represented here, but in other educational institutions that will benefit from the results of this conference.

We are pleased that you came and shared your knowledge and experience with us and with your colleagues. We are sure this is the beginning of a new and exciting era in ag-mech education.

PRESENTATIONS BY GUESTS

Two guests, Gerald Diswinka and Dr. F. K. Otto spoke to the group about vocational education in Canada and Germany respectively.

Sam Stenzel, executive director of NVATA could not be at the conference, but he sent a statement on behalf of NVATA.

Their presentations follow.

GREETINGS FROM THE NVATA

SAM STENZEL

Sam Stenzel
Executive Director
NVATA
P.O. Box 15051
Alexandria, VA 22309

Welcome to the Conference! The National Vocational Agricultural Teachers' Association (NVATA) extends greetings and best wishes for a successful meeting. The program is well designed and should provide you the opportunity to fulfill your objectives. The NVATA expresses sincerest appreciation to Lou Hathaway and John Deere for their leadership and cooperation in organizing and conducting the conference.

It seems like yesterday that Lou called our office to "bounce" the idea. The NVATA felt the workshop was exactly what vocational educators in agriculture wanted....closer coordination of local programs and industry to improve student training for employment. Needless to say, Lou and I had many telephone calls to "get the program off the ground and the ball rolling."

Your experiences at this Conference in Rock Island are the result of the cooperation and hard work of many. We are most appreciative of those persons. I wish my schedule would permit me to attend. Your attendance, experiences, and evaluation will assist the NVATA in planning similar conferences in cooperation with other agriculture/agribusiness related firms such as John Deere. Please express your thoughts and opinions. Write our office!

The NVATA is committed to member service and leadership. It is making a concerted effort to provide leadership services for all levels of agricultural education....secondary, postsecondary, and adult. We are pleased you chose to be involved in this Conference. Best wishes for a most successful Conference.

CURRICULA —GOALS AND PROBLEMS

VOCATIONAL EDUCATION IN CANADA

GERALD DISWINKA

Gerald Diswinka
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Assiniboine Community College
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Brandon Manitoba R7A 5Z9

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Sometimes Canada is known as the Great White North, i.e. eight months of winter and four months of tough sledding. Things are improving, it's snowing out West today. Training in vocational education especially Farm Machinery Mechanics is influenced by geographic factors and the constitution. In 1867 the British North America Act stated that education is the responsibility of the provinces. Ten provinces developed ten different educational systems.

First one has to examine when does vocational training begin with in the provinces. Examining the trends rather than the exceptions, most provinces have established regional vocational high schools. The final three high school years are made up of vocational programs in conjunction with the 3R's. Power mechanics programs are usually based on the automobile rather than farm machinery. Here determining factors are: (1) availability (2) majority of the Canadian population lives in large cities (3) High school councillors are still from the school of thought that to amount to something you must still go to University. One must concede that some skills learned thro power mechanics programs can be used to repair farm machinery. Statistically, very few graduates from regional vocational centres continue further training with Agricultural Colleges, Community Colleges or other technical training institutes in Canada. Agricultural colleges, Technical Institutes and Community Colleges accept graduates from high school programs directly into their vocational programs especially in Farm Machinery Repair and Agricultural Mechanics. At this point, one must also mention that the Community colleges concept in Canada is based on regional requirements. The transferability of credits earned at Community College to a University is minimal compared to the American States. Before one examines specific colleges' programs on vocational training especially Farm machinery Mechanics, one should briefly look at other vocational training programs in Canada.

A student having the basic academic requirements may enter into apprenticeship training. An agreement is signed between the employer, employee and the Provincial Department of Labour Apprenticeship Division. The employer agrees to provide on the job training and also agrees to send the apprentice to an institution for specific training topics for periods of four to ten weeks per year depending upon the trade. After about 4 - 5 years of training or 5200 hours and successfully passing a trade examination, the apprentice will recieve his journeyman,s certificate.

Vocational training may be carried on by employers through an agreement with the federal government - Canada Manpower Training Industry Program (CMITP). This program is subsidized by the federal government and is an incentive for employers to train workers in industry where skilled workers are necessary. These critical trades skills shortages are identified by an advisory committee but supervised by the provincial government to make sure acceptable standards are met.

Since this is a conference on Agmechanization, it is best to examine a few transparencies of Colleges across Canada offering programs related to our topic.

Starting in the Atlantic region, the Nova Scotia Agricultural College offers a two-year course "to help students prepare themselves for careers in farm equipmetn dealerships involving the adjustment, maintenance and repair of farm equipment." Research indicated that Nova Scotia does not have an apprenticeship program for Farm Machinery mechanics.

A review of CEGEP'S and technical institutes in Quebec revealed a program available at the Institute of Agricultural Technology at St. Hyacinthe which dealt with agricultural machines and hydraulics. Again there are no indications of apprenticeship programs in Agricultural Mechanics.

The colleges in Ontario, namely Kempville and Centralia, offer programs in Agricultural Mechanization. Training of students in farm machinery maintenace usually occurs in the senior year. Graduates from these Colleges are given diplomas with majors in Farm Mechanization.

Moving toward the western region takes us to Brandon, Manitoba, better known as the Wheat City. Here at Assiniboine Community College one finds training for Agricultural Mechanics and a two-year course in Farm Machinery Mechanics is offered. Students may get credit for the first year of the diploma program if they successfully complete the certificate course and 400 hours of approved work experience. When a Farm Machinery Mechanics student completes the above program he may receive two year's credit towards his journeyman's certificate.

The apprenticeship program in the province consisist of four levels (years), 5,200 hours of training. The first year consists of 8 weeks at Assiniboine Community College, the second 8 weeks at the College, the third 6 weeks and the final year 4 weeks.

The successful apprentice receives a journeyman's certificate in Heavy Equipment Repair which is the designated trade for Farm Machinery mechanics in Manitoba. A mark of over 80% in the final trade examination gives the journeyman an "interprovincial certificate', that is, this certificate is accepted by the other western provinces as journeyman status. This particular provincial arrangement between the various apprenticeship offices has encouraged mobility of mechanics within western Canada - especially from the "have not" province of Manitoba to the other western Provinces, which because of their natural resources are able to pay higher wages.

Saskatchewan training institutions offer a variety of courses in Farm Machinry Mechanics. The best known is offered at the Kelsey Institute in Saskatoon. This two-year certificate program has been well received by implement dealers and manufacturers. The course is arranged in such a way that the first year deals with the function and construction of equipment and a series of basic skills. At the end of the first year the student is required to work in a dealership. The second year is spent on learning further specific skills and a practice of what was learned in the first year.

The institutes in Regina (Wescana) and Moose Jaw (Saskatchewan Technical Institute) concentrate more on modules aimed at the farm worker rather than at the mechanic. However, after the completion of about 10 modules the student would be ready for "fine tuning" at a dealership.

Saskatchewan does not have an apprenticeship program designated for Farm Machinery Mechanics

A review of information available on Alberta Colleges indicates that this province has the largest number of institutions with courses for Agricultural Mechanics.

The Lethbridge Community College calendar indicates a one-year certificate course in Agricultural Mechanics. Students completing the first year at Lethbridge may enroll in the second year at Olds College to complete a diploma program.

The mention of Olds College in Lethbridge calendar leads one to investigate the Mechanics certificate. This program is designed "to train in the efficient operation, maintenance and selection of agricultural equipment." Here mention is made of a journeyman's ticket.
Other training centres in Alberta that offer certificates in Agricultural Mechanics are the Alberta Vocational Centre and Fairview College. The following transparency is indicative of training at Fairview.

An extensive search for information on the province of British Columbia revealed that the training of Agricultural Mechanics is covered by the training done in the Heavy Equipment Repair programs. There was no information in the Association of Canadian Community Colleges directory to indicate institutes of training in Agricultural Mechanics. The western Spectrum, a publication of the Toronto guidance Centre, showed no specific training for Agricultural Mechanics in British Columbia.

In conclusion, if one were to examine the course content from programs offered by various training centres in Canada, one would find a commonality among such topics as Shop Practices, Powertrains, Electrical Systems, Engine Service, Hydraulics, Fuel Systems, Tillage and Harvesting Equipment. That is to say, there are many regional disparities in Canada but a commonality of topics for the training of Farm Machinery Mechanics.

Sources of Information

Course directory published by the Association of Community Colleges 1979/80.
Eastern Spectrum compiled by Toronto Guidance Centre, 1980
Western Spectrum compiled by Toronto Guidance Centre, 1980
Calendars of Training Institutes as in list that follows:

Atlantic Region
Nova Scotia Agricultural College
P.O. Box Truro, Nova Scotia R3N 5E3

Royalty Centre
Prince Edward Island C1A 4Z1

Quebec
Institute de Technologie Aricole et Alementaire
St. Hyacinthe, Quebec
J2S 2M2

Ontario
Kempville College of Agricultural Technology
Kempville, Ontario
K09 LJ0

Centralia College of Agricultural Technology
Huron Park Ontario N0M IY0

WESTERN REGION

Assiniboine Community College
1430 Victoria Avenue, East, Box 935
Brandon, Manitoba
R7A 5Z9

Saskatchewan Technical Institute
Box 1420, Moose Jaw, Saskatchewan S6H 4R4

Lakeland College
Lloydminister, Alberta T9V 0W2

Lethbridge Community College
Lethbridge, Alberta T1K 1L9

Fairview College
Box 3020, Fairview, Alberta T0H 1P0

Kelsey Institute of Applied Arts and Sciences
Idylwyld Drive, P.O. Box 1520
Saskatoon, Saskatchewan Sk7 3R5

Wascana Institute of Applied Arts & Science
4635 Wascana Parkway, Box 556
Regina, Saskatchewan

Olds College
Olds, Alberta T0M 1P0

Alberta Vocational Center
Box 417,
Lac La Biche, Alberta T0A 2C0

Vocational Education in Germany

Dr. F.-K. Otto

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The following information on vocational training in the Federal Republic of Germany is a short and strongly simplified introduction. According to special regulations in the states of the FRG there are many interchangeable ways to proceed in the vocational career.

General regulations:

Education and vocational training in the FRG is on behalf of the society.

Thus nearly everything is governed by law (either federal or state), prescriptions, examinations and as far as vocational training is concerned by contracts between employers and trade missions. As far as the "on-the-job-training" is concerned, the Federal Decree of Vocational Education sets the standard, whereas the vocational schools are ruled by State legislation.
This information is meant to deal mainly with vocational education i.e. the lower grade of professional qualification.

The educational training regulations either already existing or in preparation are intended to ensure a nationwide, uniform education level of all trainees, thus paving the way for improving vocational mobility in many aspects.

Further education involves university education or vocational graduation of intermediate grade.

Vocational training in agriculture in the Federal Republic of Germany most of the farms, workshops and industrial plants entitled to practice training have specialized themselves in various sectors so that they can no longer provide the comprehensiveness required by training regulations. Hense the existence of farm machinery training centres especially equipped for the purpose of supplying additional training courses in the field of agricultural machinery.

Vocational education allows every successful trainee to advance in the vocational scale. Figure 1 shows an excerpt of the large variety of possibilities provided by the vocational education system in the Federal Republic of Germany, which - either equal or similar - are to be found also in other countries, especially in Austria and Switzerland. (See exhibit No.1)

The periods of technical education undergone at continuation educational institutions such as schools for technicians, institutes of technology and universities vary in accordance with the selected field of specialization.

Vocational training until the journeymen examination is done in two or three training places:

- The practical training (on-the-job) is performed on farms or workshops or factories which are licenced by the authorities according to a special "decree of eligiblility for instructing trainees". It takes roughly 4000 hours during a 3 year period. Subjects which cannot be trained on a farm or in a workshop but are essential to pass the first exam have to be taught in special training centers as I have mentioned before. This takes another 300 - 400 hours.
- The theoretical training which is done at the vocational schools requires about 1000 hours. A few lessons with practice-oriented contents are held in the schools.

Unfortunately there is a trend to shift more and more training curricula into vocational schools, thus introducing more theory into basic training.

This "theorization" - I mean the increasing emphasis laid on theory - results from the fact that some states of the Federal Republic have adopted a basic vocational year for many occupations. This means that the first year of vocational education is undergone under full-time-school conditions, whereas in the second and third year of vocational training emphasis is laid on practice, though one day per week being devoted to the vocational school.

It remains to be tested whether this system

is able to meet the occupational requirements and whether the 15 to 16 year old pupils have got a sufficient capacity of abstraction to such an extent that they are able to learn things they cannot visualize in concrete terms.

Long-time experiences do not exist so far.

Training is supervised by the competent authorities and due to the governmental regulations instructors are expected beside the technical background also to have knowledge of the legislation for juveniles, the Young Persons Act and adolescent psychology, which is to be furnished proof of by examination.

This could remind us of the regulations prevailing in socialist countries, but it is also true that this system has been proving its worth since 1921. Statistic data not only in Germany show that adolescents having undergone a careful education have better prospects in their professional life. Avowedly, some very strict regulations have been adopted over the last years involving a scarcity of the apprenticeships available. Anyhow, they may well be expected to become looser in the next future.

Who are the people to perform the vocational training and what is their professional background?

On-the-job-training at the farms or workshops is done either by experienced and examined employees or farmers or owners of workshops themselves, depending on the size of the enterprise. In large firms there may be special instructors for different occupations. This part of the system is determined by the "decree of eligibility for instructing trainees".

Teachers of professional schools must have got university education. They give lessons on more or less theoretical subjects. They are assisted by instructors who lay their teaching emphasis on demonstrations and practical exercises done with the trainees. They must have a special education tailored to these activities. They should have finished secondary school, passed the so-called "Meister" examination and have attended a 18 months pedagogical seminar.

On-the-job-training at DEULA

DEULA offers service to farmers, ag-mechanics and related occupations. At training centers which complement the field practice for farmers and ag-mechanics the instructors must have the "master" exam at least and a special professional and pedagogical training of a minimum of 21 months. With a higher-level education (engineer) this time can be reduced to 18 months. Yet, it must be pointed out that all junior-teachers have to undergo the same DEULA education irrespective of the profession they learned before.

Some words to the recruitment of teachers.

The junior-teachers of DEULA are recruited from

- Farmers who have given up their farm or are not in a position to run the farm
- Mechanics coming from workshops
- Mechanics coming from the Army
- Civil engineers (without university grade) coming after they have passed the above mentioned examination
- Technicians.

Those who have got the "master graduation" are given preference for performing practical training. Owing to salaries being fair and work diversified DEULA is not troubled by a lack of junior teachers.

In addition to the above mentioned governmental and non-governmental forms of education presented, I would like to point out some special aspects on the co-operation between industry and schools.

Industry, commerce and trade provide a large quantity of information, training and teaching aids. In the area of agriculture, all renowned manufacturers of farm machines and tractors make machines and tractors available, free of charge, not only for demonstration purposes but, in particular, for teaching on and with the equipment of an estimated total value of about 30 million DM. 20 to 21 million of these are at DEULA's disposal.

Since all important firms are represented neutrality is guaranteed. Of course teaching on the machine implies a certain publicity effect. But all manufacturers have got the same chances. Usually they take back their machines every 6 months to 1 year and replace them by new ones. That is the way schools do not become museums.

In addition, either instructors will attend training courses at the factories or factory mechanics are seconded for technical discussions and demonstrations to DEULA centers; this is being done free of charge.

Industry in the agricultural sector calls on the services rendered by the DEULA Training Centers for the after-sales information and training of their customers as well. The calculation shows, that using a service organisation is sometimes cheaper as to have industrial owned training facilities. This kind of co-operation has proved a success for more than 50 years and is carried on in spite of the present economically hard times.

Some words about finances:

The vocational training in the Federal Republic of Germany is financed in such a way that the apprentice is given an adequate allowance by the training shop. For

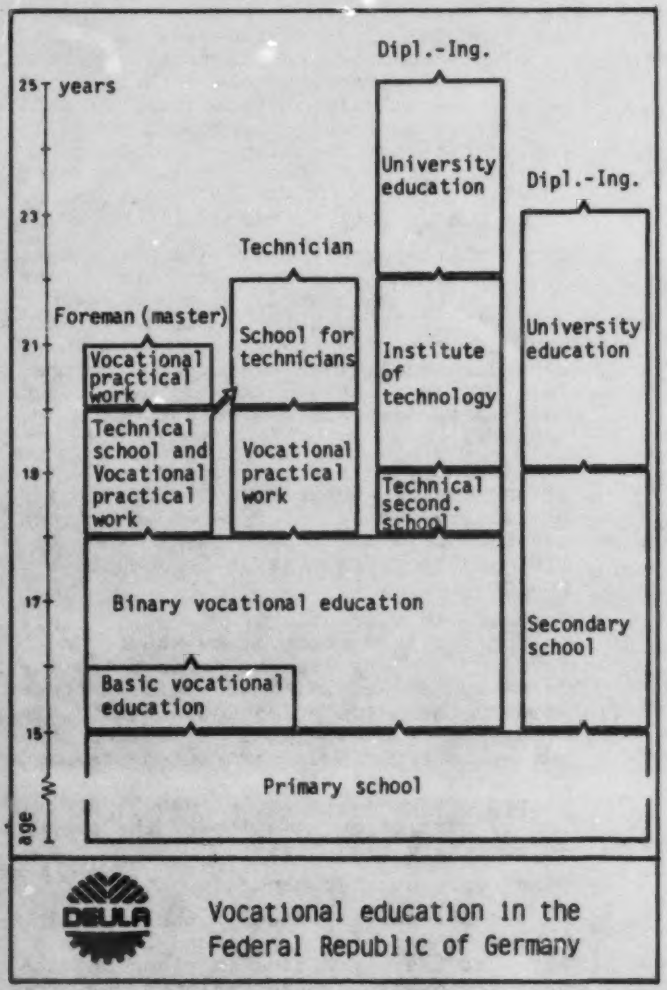
garments he has to care himself. The training shop pays the charges for tools, books and fees of special courses.

The vocational schools are financed by the Government.

We feel it absolutely necessary to guarantee good and comprehensive vocational training

- to meet the requirements of the dealers and their customers
- to enable trainees to do a high-quality-work which may be worth higher salaries
- to reduce unsufficient work being done by unqualified workers and
- to allow young people to advance in their professional career.

We have to care that the students get their "sharp edged axes" as Walt Whitman, one of the famous American poets said. Thus we can help them and us to reduce the danger of unemployment and to meet the tasks of the future.



SUMMARY OF CONFERENCE ACTIVITY

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SUMMARY OF CONFERENCE ACTIVITY

(A Comprehensive Topical Consolidation by each Session Chairman)

The following pages include a detailed summary of the presentations, workshop activities, reactors' responses and other events relevant to the conference. No attempt has been made to include every point of view or every comment. Every attempt has been made to include *all significant* issues and the various positions taken. During presentations, reports and reactions similar statements were often made. We have tried to eliminate most of the redundant statements; consequently, one individual quote is used which best expresses the position in lieu of quoting every person who made a similar statement.

Finally, there has been no attempt to draw conclusions or formulate recommendations outside the conference itself and for the purpose of this report. It is our best judgment that this summary is a fair and complete representation of the conference proceedings.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

Session Summary

by

Louis Hathaway, Session Chairman

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The purpose of this session was to present a company's viewpoint of its present role in ag mechanization education. Presentations were given on company philosophy for customer service and vocational educational activities. Also discussed was assistance that the company gives in teacher training and educational aids.

THE CHALLENGE OF PROVIDING GOOD CUSTOMER SERVICE

Robert Sohl said, "The challenge for providing good customer service is a substantial one, one that cannot be resolved by industry alone." He said that in the past, "dealers often 'got by' by employing mechanically talented farm boys who then learned through the school of experience and the manufacturers' service schools. But such an approach is no longer acceptable or practical. Farm machinery has changed dramatically in size, complexity and performance capability. Likewise, the farmer has progressed to new demands in machine performance and expectations for support. Downtime is not anticipated nor tolerantly accepted."

He presented a study that indicated a high percentage of returned no-fault components. His facts showed a 25 percent diagnostic error rate in the repair of electrical and hydraulic systems and other components incurred diagnostic error rates in excess of 50 percent. He said, "undoubtedly, much of the error is caused by the incompetence of individuals," who didn't receive adequate technical education.

Sohl concluded, "How do we bridge the gap between need and capability? We believe the answer is in the availability of more intelligent, well-trained, highly-skilled technicians — individuals with the mental capabilities to understand complex systems. We further believe that our best resource is through the community colleges and vocational trade schools. Industry and its dealers do not have the capability or time to identify and prepare candidates for a career in ag mechanics. We need the vocational schools. We need that synergistic impact of a partnership in industry and education."

REACTOR

William Schreck reacted to Bob Sohl's presentation by stating that a partnership between industry and education must be established to help industry meet this challenge. Schreck said "the partnership must begin with the identification and implementation of opportunities for the training of teachers by industry. The heavy burden of technically and financially supporting education in the nation's high technology industries has become awesome—and in many instances faces an impossible task. Therefore, a partnership in ag mechanization between industry and education is not only beneficial to each—it is critical to both!"

TEACHER TRAINING OPPORTUNITIES IN INDUSTRY

Larry Hodel said, "teachers of Ag Mechanization programs are invited to John Deere Company service schools, either sessions offered for dealer technicians or special sessions for educators. We appreciate instructor's attendance, and we believe these sessions are beneficial to the instructor."

He said that we encourage the Area Service Managers to work with educators and invite them to territory training sessions. Schools that have an Ag Mechanization program are invited to work with local dealerships because dealers provide one of the best locations for placement of community college graduates. Hodel added, "we believe on-the-job training at farm equipment dealerships is extremely effective in the educational process." He concluded by saying, "we encourage John Deere dealers and John Deere employees to support Ag Mechanization curricula at community colleges and universities in any way that they can. The farm equipment industry needs the Ag Mechanization graduate and must in turn support the Ag Mechanization programs in every possible way."

REACTOR

William Schreck also reacted to Hodel's remarks and said, "an Ag Mechanization partnership should provide for the sharing of resources to train teachers in high technological skills; to make available specialty tools, equipment, and facilities to meet inservice needs; and offer sites for on-the-job training of students. Perhaps the most important activity would be the active involvement of key personnel in the planning, development, and implementation of training programs at all levels for both education and industry. Perhaps the initial effort should be for the partnership to acquire a commitment from state and national leaders to support high quality programs in vocational education to meet the nation's skill-training needs."

INDUSTRY'S ASSISTANCE IN RECRUITING STUDENTS

Rollan Bonneau (from a community college) and Joe Poulter (a Deere dealer) discussed how one dealership and vocational school have worked together in recruiting students. It is noteworthy that Bonneau had worked for farm equipment dealers, including Poulter, before joining the ag mechanics department at his college. They discussed other subjects concerning their working relationship that the reader may want to review in their paper.

Poulter said, "I believe that the implement dealers need to be readily available to talk to any prospective students both at the store and at the local high school. Visits to the store could be on an individual basis, with brochures available at all times to explain the programs that are offered. In addition, the John Deere dealer could provide space for representatives from the vocational school to set up a display for promotion of the program during the local dealer's 'Farming Frontiers Days' programs" held during the winter.

Bonneau added that he agrees with that idea and suggested summer sessions could also be held at the dealership to allow the college representative, "to explain the program available at the college and how the dealer views this as essential . . .," to the education of those he will employ.

Poulter suggested that local 4-H clubs and Future Farmers of America chapters could invite representatives from vocational schools

to visit with prospective ag mechanics students. An employee of the dealership should be present to assist the vocational school in presenting information to the groups.

Bonneau agreed that when the college recruiter visits a local high school, "it would be helpful if the implement dealer could also be there to speak to the group about the training the students will receive at the college and how this is important to the dealership."

Bonneau suggested another recruiting aid, "I would also like to encourage dealers to contribute a small amount of money that could be used as a scholarship for the outstanding ag mechanics student at the high school each year."

Poulter concurred that the local dealer should take the lead to promote employment and activity of ag mechanics students who excell.

REACTOR

Larry Munton reacted to Bonneau's and Poulter's presentation by stating that:

1. Private schools, "...are enrolling students at three to four times the tuition of public schools.

2. "We need an entry level test to help us measure..." skills, attitudes and intelligence. Industry should identify their requirements.

3. We may have to look at nonfarm population for students because of the shrinking farm population.

4. We need to convince some students that the 4-year college or university is not the only avenue to success.

5. Colleges need to assign responsibility of recruiting to specific individuals and develop their marketing abilities.

6. Recruiting students will be easier when industry. (1) figures out why unskilled factory workers start at $12.50 per hour and hour and skilled technicians with a sizeable investment in tools and education start at $6.00, and (2) takes steps to correct the discrepancy.

AVAILABILITY OF TRAINING COMPONENTS FOR EDUCATIONAL INSTITUTIONS

Phillip Lane said, "there is a large variety of components available from John Deere to strengthen and enrich ag mechanics courses." He added that vocational schools that supply potential employees to the agricultural implement industry qualify for the special price offer of one-half of list price. In some cases he explained donations as well as short term loan of components are also available. "There are a number of ways of financing the purchase of these items," he said. "Use some creative finance ideas and when you are ready to buy a component, contact your nearest John Deere Sales Branch Service Department for more information.

REACTOR

Larry Munton said in reacting to Phil Lane's remarks, "Industry has been excellent in assisting education with the donation of hands-on training equipment." Many educators cannot take advantage of the discount purchases because of financial constraints. Hardware packages are the most valuable when they include: the hardware, educational software and training for those not familiar with the equipment. He concluded, "Finally industry should prioritize contributions and effectively manage contributions to assure effective utilization."

AVAILABILITY OF TEACHING AIDS (SOFTWARE)

"Teaching aids are very important to make any class more effective," John Spuller said.

He pointed out that anytime a component or piece of equipment is used in a classroom, the support publications should be available to the students. He added, "each of these printed documents contains specific information which the student will need to reference on the job. Becoming familiar with using these items as an integral part of their training, develops good work habits in the student."

He said that in addition to operator's manuals, technical manuals and parts catalogs, other printed publications are available give "generic coverage" to machines and their systems. "John Deere had 29 publications in four series of manuals available which cover all of the major systems on equipment and the major categories of agricultural machines. These publications are our *Fundamentals of Service* (FOS), *Fundamentals of Machine Operation* (FMO), *Compact Equipment Fundamentals of Service* (CE-FOS) and *Machinery Maintenance*. These books all have slide sets available and many have instructor's guides available to assist in classroom activities," Spuller related.

Further he added, "sound/slide programs, video-tapes, and films on selected subjects are available from John Deere for purchase. Other classroom aids for the instructor include service training courses that cover specific John Deere equipment and their systems. Spuller concluded, "catalogs are available from John Deere upon request." Be sure to describe the specific items you may be interested in so that you receive the proper catalog. Send your request to Deere & Company, Service Training Department, John Deere Road, Moline, IL 61265.

REACTOR

Dale Parker reacted to John Spuller's presentation by stating that dealers and company personnel should remember the local schools before discarding outdated or revised software. The schools can use such material because minor changes don't affect the basic information for educators.

FURTHER INVOLVEMENT OF INDUSTRY

Dan Schwitters (a Deere dealer) said that dealers are committed to their suppliers, customers and employees. "This commitment requires trained and competent technicians on the dealer's staff. And such education is a challenge to all in attendance at this conference.

He added, "Partners in Ag Mechanization suggests that dealerships establish lines of communication with local secondary, postsecondary, FFA, 4-H Clubs, etc. to define objectives and goals for better understanding and cooperation."

Schwitters suggested that dealers become involved in school political activities, committee work and agricultural organizations because of mutual interests. To keep secondary and postsecondary instructors up to date, they should be invited to special seasonal service schools at the dealership. The dealer technician could help teach using the latest audiovisuals and new technology in the schools or in the dealer's shop.

For schools without necessary equipment, the dealer should loan it to schools. Dealers can spark interest by sponsoring student scholarships and presenting awards to technicians for outstanding accomplishment. Dealers can encourage interest and rapport in Ag Mechanization between industry and education.

Schwitters emphasized, "the ideal situation in a dealership is a sales motivated service department and a service oriented sales department."

He concluded, "dealers want to hire graduates with a thorough understanding and a working knowledge of the basics of the machines used in this area. Graduates must understand the competitive free enterprise system of doing business and must be willing to perform a days productive labor for a days pay."

Reed McCulloh (a Deere area service manager) outlined how industry representatives can work with vocational schools: The field service representatives of large companies are the liaison between industry and education. Both the representatives and schools need to know each other's expectations, needs, future plans and capabilities. The representatives may then assist in the following ways:

1. Curriculum: Make sure basic concepts are well ingrained.

2. Instructors: Help to keep them up to date by scheduling them to Branch schools or to local service meetings.

3. Students: Preview the job world by telling them like it is out there; talking to them about the job possibilities; stress importance of not only technical education at school, but social and economic education of the real world. The Representative can also assist in the technicial training of the students by covering a subject for one day, subjects such as predelivery and initial adjustment, theory of operation of troubleshooting and diagnostics of a particular machine.

4. Teaching aids: The Representative can help in obtaining some components or assemblies, those not fit for customer use, but still good for laboratory work.

5. Dealers: Encourage local dealers, which the representative calls on, to support the school.

6. Advisory committees: Representatives can be good resources for help on your advisory committee. Ask them to serve.

Gary Hendrickson (a Deere Branch Service Manager) said, "we encourage our dealers, area service managers, territory managers, division service managers as well as myself to serve on advisory boards and committees in state and national organizations. We can provide guidance to these organizations so they have an insight to our industry's needs.

In our Branch we have a continuing service training program for dealer service technicians. We welcome an opportunity to have educators attend our classes so that they might stay abreast of the industry's educational needs. In my past I have had an opportunity to be deeply involved with several universities and technical schools in our sales branch area that did participate in our service training sessions each year. They found it extremely beneficial.

In our service training centers we have numerous components, training aids, slides, cutaways and so on that could be loaned to schools during our off seasons or when these items are not in use. There are also times when we have damaged items that may not be usable in a machine, but would make excellent training aids that could be donated to your efforts.

We feel it is extremely important to encourage a working rapport between our industry and you people as educators through conferences as you are attending this week. We would also encourage our people and dealers to sponsor conferences at a more local level."

REACTOR

Dale Parker summarized his reaction to Dan Schwitters, Reed McCulloh and Gary Henrickson by stating:

1. We need dealer and company communication.

2. We need local service seminars.

3. We need scholarship and accomplishment awards.

4. We need dealer administrators to visit and talk with prospective mechanic students about the reality of the business world.

5. We need job opportunities information from dealers and company reps.

6. We use advisory committees.

7. We use your Waterloo factory tours.

8. We use your branch service schools.

9. We use your hardware that we receive from John Deere in our programs.

"This would be worthwhile to hold around the country so more teachers and dealers can participate."

Arthur Ives
National Vocational Agricultural
Teachers Association

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Session Summary
by
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The objective of this session was to discuss one of the most important links in the Post-Secondary instructional program chain, that of the instructor and his or her role in planning, organizing and delivering a quality Ag Mechanics instructional program.

THE QUALITY AG MECHANICS INSTRUCTOR

Harold Crawford discussed three major areas of concern for the quality instructor:

1. Personal - this includes **competence** in subject matter and **method** in delivering subject matter.

2. Program - two basic points that the instructor can control under program are; a) is the program **current** and b) is it **relevant** to todays agricultural industry.

3. Physical - the physical environment maintained in the program is a reflection of the instructor and two major points include **organization** and **safety.**

RECRUITING & PROVIDING QUALITY POST-SECONDARY INSTRUCTORS

Educational Requirements for Instructors in Ag Mechanics Programs

Larry Case discussed two categories of competencies and/or skills that instructors should possess.

1. Educational Programming Skills - These skills can be divided into a) **program management activities** including: development of curriculum materials, managing facilities and equipment, working with outside groups such as advisory committees, employers and being able to function in a public institutional setting and b) **teaching/learning activities** including: using variety of teaching methods, understanding students motivation and learning, working with students in classroom/laboratory settings and working with students in non classroom/laboratory settings.

2. Technical Skills - A quality instructor must possess a knowledge of and be able to perform the tasks he or she plans to teach to students. A continuing need for updating and inservice education should be required for all instructors.

Reactor

Gordon Jindra reacted to Larry Case's presentation by discussing the following as important points to consider: 1) analyzing educational requirements; determining the teacher's role on the job and developing technical, management and teaching skills. He further emphasized the importance of on-the-job training and suggested that it be accomplished in a variety of ways including: 1) extended leave, 2) summer jobs, and 3) working with dealers or industry while visiting students during their on-the-jcb training program.

Technical Competence Requirements for Instructors

Victor Bekkum addressed this question by discussing factors influencing technical competence of instructors which have evolved with the developing technologies and include: 1) economic conditions, 2) energy resources and 3) soil erosion. He stated the major technical competency areas for post-secondary instructors to include: tractor power, machinery management, electricity, and soil and water conservation. Related competency areas include: computers, methods of teaching, communication skills, management and public relations.

Reactor

James Frisby reacted to Vic Bekkum's presentation by stating that the term agricultural mechanization does not mean the same to everyone. Ag Mechanization at the four-year university is not intended to train technicians in specific skills but persons to work in sales or service management jobs in industries or return to the farm. Contrasting the voc-technical o. community college ag mechanization program is intended to train skilled technicians. Both programs require different instructors with different backgrounds and experiences.

Where Should Instructors Come From? - Background Experiences

Lanny Anderson pointed out that presently most post-secondary instructors are recruited from the ranks of secondary ag instructors, technicians from industry or other persons with mechanical backgrounds. Instructors should come from the formal education preparation route rather than the industry route, have a farm background, college technical course preparation (although presently limited) have "hands on" on job experience and remain current through inservice education by attending training session in industry. Anderson pointed out that instructors coming from industry do have the technical competencies but often lack the educational competence so necessary to communicate with students. The ag mechanics instructor is an educator not a mechanic.

Reactor

Hubert Helmkamp reacted to Lanny Anderson's presentation by stating that he believes instructors should come from industry and receive methods type courses to help them become a quality instructor. Points discussed included: technical skills or knowledge cannot be gained without actual experience, post-secondary instructors are teaching people in agriculture, the person from industry has his finger on the pulse of industry, the good technician has a wide variety of experiences and the instructor with a strong technical background can handle the formidable task.

How Do You Recruit Competent Instructors?

William Rich pointed out the following steps in recruiting competent instructors: 1) developing a well worded position announcement including an application form, 2) mailing the announcements to selected target groups, 3) advertising the position, 4) reviewing the applications, 5) conducting effective interviews, 6) making a final decision, and 7) hiring the most competent instructor for the position. Persons in charge of recruitment and hiring must use good judgment and have a thorough understanding of the job requirements in order to find the most qualified person for the position.

Reactor

Howard Johnson reacted to William Rich's presentation by stating: 1) there will be more competition for qualified instructors in the future, 2) required experience should be included on the job description, 3) the announcement should have flexibility on such areas as required degrees and job starting date, 4) include trade magazines and professional organizations in advertising, 5) applicants should be requested to make a presentation during the interview to the staff, and 6) the total staff should have a part in the selection process.

Basic Qualifications Looked for in Ag Mechanics Instructors

Walter Nechville discussed the following ten basic qualifications for Ag Mechanics instructors: 1) must meet state certification, 2) masters degree if possible, 3) two to four years teaching experience, 4) recent trade experience, 5) likes people and has an honest desire to help people, 6) willing to listen and accept new ideas and changes, 7) be able to develop and operate on a pre-arranged budget, 8) not allergic to paperwork, 9) willing to work more than eight hours per day, and 10) qualifications sought by all employers such as honesty, trustworthy, positive attitude, confident, reliable and dedicated.

Reactor

Dwight Mobley reacted to Walter Nechville's presentation by stating that most states have the same minimum educational requirements for instructors. In addition, he emphasized that trade experience is helpful but mechanical aptitude is a necessity, classroom management techniques are very important, a winning personality and a willingness to work, plus an open mind to suggestions and new ideas along with a willingness to upgrade teaching skills via inservice are all important basic qualifications for a quality instructor.

KEEPING POST-SECONDARY INSTRUCTORS TECHNICALLY AND EDUCATIONALLY COMPETENT (Workshop Sessions)

Industry's Role in Keeping Instructors Technically and Educationally Competent

Bene Windsor summarized this question with the following comments from his group: 1) It is often difficult for instructors to schedule time to attend industry workshops and conferences. 2) Possibly more workshops could be scheduled in the summer or during school breaks like Christmas or semester breaks. 3) Work out an arrangement so instructors can get credit for attending workshops and service schools. 4) Communication between industry and educational institutions should be stronger to enhance a cooperative effort between the two groups to help keep instructors up-to-date and more competent.

Henry Torkelson summarized this question by sharing these views from his group: 1) factory schools are good but scheduling can be a problem, 2) service schools should be classified according to level, beginning or advanced, 3) instructors should receive salary plus expenses while attending service schools, 4) dealerships and company fieldmen should be available to aid instructors in keeping up-to-date, 5) companies should make manuals, films and equipment available to school programs either on loan or rental basis for use, and 6) continue to communicate with each other to maintain a positive relationship.

Reactor

Cletus Fontaine summarized his reactor group response by stating:

1. Industry must offer more training sessions at time convenient to instructors school schedules.
2. Industry should cooperate with universities to help make credits available for training.
3. School facilities should be utilized by industry when introducing new equipment and conducting schools for farmers.
4. Industry should invite instructors to dealer training schools.
5. Service representatives should stop in at local vo-tech schools when in the area.
6. Service manuals should be donated to mechanics teachers rather than being discarded by dealers.
7. On-the-job reports, submitted by dealers to schools should reflect an honest appraisal of the trainee.

Communication between industry and post-secondary programs is the key to maintaining instructor/competence.

University's Role in Keeping Teachers Technically and Educationally Competent

Mervin Bettis summarized his group session by stating: 1) most inservice training from universities is for the secondary teachers and not post-secondary or community college, and 2) the university's role will probably be more for educational skills (curriculum, teaching methods, etc.) rather than technical competence.

Eldon Chapman summarized the discussion in his group in two categories; 1) technical - what to teach and 2) educational - how to teach. In category one the points made were - the university: 1) should allow credit for industry workshops, 2) work closer with industry which can provide instructors for service schools, 3) provide inservice, and 4) include job experience for students and allow credit for this experience; under category two - how to teach, it was pointed out that the university can provide the most help by providing courses on methods of teaching and providing teaching experience for technical instructors.

Reactor

David Cattron summarized his reactors group by stating: 1) universities are not geared to high technology training in ag mechanics, 2) the term "Ag Mechanics" means different things to different people at the university level, 3) universities can best provide training to teachers for educational competence and should assist new or beginning instructors, 4) sufficient numbers of teachers for university classes can be a problem, 5) universities should help grant credit for workshops from industry, 6) universities could develop or reorganize some of their education courses to fit special needs of post-secondary instructors, and 7) universities should continue to help instructors by providing teaching materials for programs in Ag Mechanics.

Post-Secondary Schools Role in Keeping Instructors Technically and Educationally Competent

In addressing this question Roger Beck summarized his group workshop by discussing the following three major areas:

1. Administration must work directly with staff to develop plans, policies and procedures that provide opportunities for keeping instructors competent in such areas as inservice, leave, credits, certification, financial support and evaluation.

2. Staff motivation including O.J.T. programs, workshops/ schools and administrative support.

3. High technology competence including staying with the basics, keeping up-to-date and being in the real world, dealer visitations, and using advisory committee members.

Donald Schwarz summarized his group discussion by stating that the post-secondary school should:

1. Provide for and encourage instructors to participate in training with industry and universities,

2. provide continuing inservice activities in teaching methods and techniques,

3. provide a sabbatical leave program,

4. encourage instructors to communicate with local dealers and related businesses,

5. provide budgets for the best equipment and supplies for teaching, and

6. secure recognition and support from land-grant colleges for vo-tech programs and its instructors.

Reactor

Harry Pry presented the following reactor group statement to summarize this question: The administration at the post-secondary school should promote development and maintenance of instructional competence through providing: motivation, rewards, financial support, rank, tenure advancements, and salary increments for instructor participation in technical and professional development.

The Ag Mechanics Instructor's Role in Keeping Technically and Educationally Competent

Ron Della Croce listed the following points to summarize his small group session: The instructor should set priorities to: 1) review and purchase update service training materials, 2) return to industry for update experience, 3) attend service training sessions at local dealerships, 4) stay on mailing lists for literature and training session schedules, 5) make themselves known to industry field representatives and seek advice, and 6) keep in contact with teacher trainers at universities for methods updating.

In addressing this question Ken Drollinger summarized his group discussion by stating, instructors should:

1. evaluate their personal needs - technical and or educational,

2. seek out and attend inservice training sessions - seek funding for training,

3. obtain and study current publications,

4. join and participate in technical and educational professional organizations,

5. seek out and participate in work experience,

6. establish and maintain personal contacts with industry people,

7. attend ag equipment trade shows,

8. participate in staff development seminars,

9. work towards a B.S. or advanced degree, and

10. take advantage of sabbatical or other leave programs.

Reactor

The reactors panel response was summarized by Dale Sanderson. The following summary statements were presented: Instructors should:

1. Make time to attend technical seminars,

2. keep up-to-date by reading periodicals and references,

3. keep communication lines open to industry and higher education institutions,

4. be dedicated to the program and students,

5. attend summer programs,

6. communicate to administrators on the importance of attending workshops and seminars,

7. use student and other evaluation reports to improve teaching,

8. update curriculum, and

9. listen to and use advisory committees for changing and updating programs.

SESSION SUMMARY

The following are overall summary statements for the session on Teachers for Quality Ag Mechanics Instructional Programs:

1. Post-secondary instructors should be educationally and technically competent.

2. Industry should play the major role and responsibility for helping instructors develop and maintain technical competence.

3. Educational competence can most effectively be handled by universities including courses in teaching techniques, curriculum and development of instructional materials.

4. Communication between post-secondary programs and instructors and industry and universities should be improved and maintained.

5. Post-secondary instructors should take the initiative to upgrade themselves by attending service schools, reading and studying references and related literature, participating in work experience programs, and communicating with dealers and related industry.

CURRICULA - GOALS AND PROBLEMS

Session Summary

By
Robert Wolff

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Curricula in Agricultural Mechanization was explored and discussed in a constructive manner by representatives from Deere & Company and educators from secondary, post-secondary and university levels. Goals, problems interfacing, on-the-job training and ways and means to improve cooperation between industry and educational institutions were the central themes of the Tuesday session.

PERSONAL VIEWPOINT OF CURRICULA

Unique personal viewpoints on Ag Mechanics curricula were offered by Ralph Hanes (representing industry), Bill Hoffman (representing a dealer), David Jones (now also employed with Deere & Company and a former ag mechanic graduate, and Robert Krumwiede representing a post-secondary Ag Mechanics Technical College.

Graduate's Point Of View

Concerning recruitment and selection for Agricultural Mechanization programs, David Jones shares some interesting insight into his own background. His insight is especially important when a number of people in the session stated that a major problem with the Agriculture Mechanization program was related to the varied background and selection of serious students with the ability to succeed in a career in the farm machinery industry.

Jones stated:

> The environment in which I was raised shaped my life into what it is today.
>
> My father was a handyman about the house and I used to help him as kids do. My interest in mechanics began by watching him and developed more by repairing my bicycles for my paper route. While in junior high I purchased a garden tractor and kept busy mowing lawns, plowing snow and tinkering with the tractor.
>
> My interest in agriculture came from being raised in a small farming community of Geneseo, Illinois, and having several friends who lived on farms. During high school I worked summers and weekends on a farm and it was there that I decided Ag Mechanization was the direction I was headed. . . ."

The "hands on" type learning at the community college provided valuable experience for Jones as a technician. He suggested that adjustments in field conditions and instruction in the basics of electronic components and computers seem to be essential to the educational needs for the future.

Reactor

Gerry Vanderloop reacted to David Jones' comments and concluded, "It was ironic that Dave concluded his presentation by stating that he presently is working toward a four-year degree.

This fact stresses the importance of both the two year and the four year programs and the needs of the student change as they mature and grow.

Programs must be flexible to meet the changing needs and goals of the students."

Industry's Point of View

Education for service technicians in the farm machinery industry should have a common goal, according to Ralph Hanes; and that goal should be to satisfy customers. For those students aspiring to a career in service this point cannot be overemphasized. Hanes expressed his views as follows:

> "Customers expect technicians to provide timely, cost effective, and reliable repairs. This requires proper training at four levels. Manufacturers provide training on systems, problem diagnosis, and equipment changes. Dealerships train technicians on shop operation, machine repairs, and problem diagnosis.
>
> Education at post-secondary schools should prepare students for entry into dealership and further training. Basic skills, basic systems, machine repair, and problem diagnosis are required in the technical area. Injection pump training is becoming less important for dealership technicians because it is a specialized field. Although less class time is needed, personal and management education are also required to produce a fully trained technician. Work-study programs should be a requirement for graduation from a post-secondary school so the student can apply his training in actual conditions.
>
> Technicians must continually train themselves to provide proper satisfaction for today's customer."

Reactor

Larry Korte agreed with Ralph Hanes' viewpoint and added that curricula must get back to basics. He concluded that industry and education need to support and work with each other.

Dealer's Point of View

An interesting point made by Bill Hoffman representing an agricultural equipment dealership was that a technician during the first two years of employment usually recovers an income only about one-third of his expenses. Hoffman echoed Ralph Hanes' thoughts and expressed the importance for students and technicians to recognize the importance of customer satisfaction with service. In addition, basics such as reading parts books, proper completion of job sheets must not be overlooked in training technicians. To an even greater extent Hoffman's comments certainly reinforced the need for an advisory committee to aid in the development and maintenance of post-secondary Ag Mechanization programs.

Reactor

Ken Ross responded to Bill Hoffman's remarks with these comments: "I teach at a school with open enrollment. . ." and if the student is poor at reading, writing or use of math skills it is impossible for them to follow the instruction. They need those basic skills before they get to the post-secondary level. These students are not getting the basics in grade school or high school. Ross added that such students should not pass or graduate from high school if they lack these basic skills.

Instructor's Point of View

The educational system must be designed to meet both the needs of industry and students. Robert Krumwiede stressed this point in addition to the need for education in the present and the future.

He stated. "Various authorities on the future have given estimates that by the year 2000, 70% to 90% of the jobs that will be available then do not exist today."

More than ever, today's graduates must be adaptable to changes. The "memory/recall" method of teaching and learning must be objectively reevaluated and communication skills, problem solving, and fundamentals emphasized in all levels of public education was stressed by Krumwiede.

Reactor

Perry Brooks summarized his response to Robert Krumwiede's remarks, "Let's get back to basics, in a fast changing future, the basics are building blocks by which students/employers can train/retrain to fit the ever changing needs of industry. Students need entry-level skills that can be built upon by many different manufacturers. Students need to be able to solve problems and use logical thinking to diagnose complex systems into simple solutions. Industry needs to take the lead in identifying the new jobs of the future. Finally, the decision of what is the cooperative role of various schools curriculum needs to be addressed."

CURRICULA IN SECONDARY SCHOOLS

A variety of different views with general consensus were presented by the various workshop groups and reactors on curriculum content, knowledge and skills required, problems associated and ways and means industry and the secondary school might cooperate to improve Ag Mechanization instruction.

What Should the Ag Mechanics Curriculum at the Second School Include

It was suggested by the workshop chaired by Ed Breece that the high school Ag Mechanization program should be exploratory in nature including a balance among classroom work, lab projects and encouraging practical experience. These thoughts were expressed by several workshop groups.

Reactor

Dale Drees' reaction group echoed the same ideas. And he emphasized the need for students to become familiar with the technical aspects of operation, service and maintenance at a level that provides an understanding at a basic level.

What Knowledge and Skills Should the Secondary School Students Develop?

Several educators and industry representatives expressed similar remarks given by the workshop chaired by Richard Lindhardt. He emphasized the importance of academic competence in the basic skills in reading, writing and problem solving. In addition, and of equal importance at the high school level, it was suggested that personal attitude development in appreciation for tools, machines, work habits, leadership skills and career awareness is important in the development of high school students.

Reactor

In reference to skills and knowledge to be developed in high school Ag Mechanization programs Jim Guillinger suggested the following:

> Manipulative skills and identification of tools and equipment needs to be developed at this stage of education.
>
> Hands-on instruction in small engines, identification of parts, the operation processes of specific mechanical parts in machinery and equipment as well as the service and maintenance of farm equipment.
>
> Development of computer usage will be needed as the electronic age advances into Ag Mechanics and the industry.

What are the Major Problems Associated with the Secondary Ag. Mech. Program?

Major problems identified in secondary Ag Mechanization programs by the workshop chaired by Jack Bailiff were numerous ranging from basic abilities of students and teachers to time the facility limitations. It was noted that the curriculum at the high school level lacked conformity and is not clearly defined at this time. Don Ward's reaction echoed these statements.

How Can Industry and the Secondary School Cooperate to Correct Defined Problems?

The use of an Advisory Committee was suggested by Bill Hires workshop group and several conference participants as the vehicle for industry and the secondary educational Ag Mechanization program as a cooperative means for program improvement at the local and national level. It was also suggested that secondary school teachers be invited to and attend dealership schools, machinery dealerships supply machines for set up instruction and used components for instructional purposes.

Reactor

Reactor Tim Claus echoed many of these same thoughts and added that industry and the educational institution must work at enhancing the public image of the farm machinery technician.

CURRICULA IN THE POST-SECONDARY SCHOOL

It was in general agreed that the post-secondary schools were responsible for education in ag Mechanization for specific technical employment through formal hands-on instruction and on-the-job training on modern machinery.

What Should the Ag Mech Curriculum at the Post-Secondary School Include?

William Schreck's group proposed:

> The curriculum should be developed around established "standards" for agricultural mechanization by educators with direct involvement of agricultural equipment personnel at all levels of the industry through a bona fide advisory committee. Students should be encouraged to enter from articulated programs with basic skills and reading, writing and math; and offering a basic understanding of ag mechanics operations.
>
> The post-secondary curriculum must include instruction in basic mechanical skills; develop the latest technical skills of the

industry; promote appropriate work techniques, and expand personal development qualities.

Although some specific knowledge and skill areas were defined by the workshop group. Specifics were proposed by others at the conference such as tool usage, operational adjustments, predelivery problem diagnosis, repair, human relations, leadership and work habits.

Reactor

Marvin Case reported how his group reacted to this topic with similar comments already made, but he added that courses should be approved by a local advisory board. Students should get experience and training in field service calls. The need for on-the-job training was emphasized and the ability to operate a computer for technical information was also suggested.

What Knowledge and Skills Should Post-Secondary Students Develop?

William Ryden, expressed some difficulty in reaching consensus in his workshop discussion. He summarized the following:

This discussion group had difficulty arriving at a definite set of knowledge and skills that should be developed at post-secondary level. It was obvious that the people representing the various institutions have definite differences in their goals and purposes. For example: The vocational technical institute offering a two-year program would have a different list of requirements than a four-year college program. While discussing the various philosophies, it became apparent that it is necessary that the specific role of the institutions be identified and understood. In many cases, it seems that there is a duplication of effort and, in some cases, competition between the various institutions within a state.

It was felt that the topic of this discussion was extremely important and should be pursued in greater detail. It appears that there is a definite need for a planned and organized approach to the curriculum problems in each state. Time was extremely limited at this type of conference, however, the ground work has been laid and the members of this discussion group felt extremely rewarded in having been able to participate and are thankful to Deere & Company for offering the opportunity to gain additional insight into the challenge at hand.

Again, as with the secondary school, it was suggested that an advisory committee composed of educators and people from industry determine the needs for Ag Mechanization at the post-secondary level.

Reactor

Harold Gates reacted with these thoughts by his group: Students must be organized and have safe work habits. They must be able to understand verbal and written instructions. They must know how to use special tools. The instructor must evaluate the competencies of the students. Last, but not least, the students must take pride in the job.

What are the Major Problems Associated with Post-Secondary Ag Mechanics Programs?

Allen Linster reported for Ron Anderson's workshop group and reported on several identified problem areas:

- Insufficient time to teach everything required.
- Providing hands-on training and getting the needed equipment.
- How to prepare students for the "real" world in a dealership.
- Problems attracting good students because of image and pay.
- Schools and state department must do necessary research for types and designs of needed programs.
- Using the instructor's time effectively rather than wasting it on tasks of questionable value.

Reactor

Francis Hethcote reported his group's reaction that time is the biggest problem.

> "When the Ag Mechanizations programs were started in Iowa in 1966, it was decided to teach the basics. That is all we are teaching today but due to the change in Ag machines, there are more basics. Air conditioning was not considered necessary at that time. Electronic monitoring systems are definitely with us at this time. It is believed by many that mini computers will be controlling many of the functions of our machines in the near future. Now we are talking about some basic electronics and basic computers.
>
> We need more time for them to learn the original basics better and where do we find the time to teach these new ones today and the ones we don't know about that will be here tomorrow."

How Can Indusry and the Post-Secondary Schools Cooperate to Correct Defined Problems?

Richard Loberger's group suggested the following four points to improve education-industry cooperation to improve Ag Mechanization programs:

1. Use of dealers and/or dealer associations for recommendations of potential students.
2. Set up entry criteria as the use of the pre-entry test.
3. Use of an interview requirement by the instructor of the program.
4. Use of aptitude tests. These tests will identify students who have mechanical aptitude and appreciation.

Reactor

Harold Stogsdill in his reaction to the workshop's report on improved cooperation suggested a need for: mutual honesty, improved communication, realistic expectations, improved guidance by industry, and closer cooperation in training efforts.

CURRICULA IN THE UNIVERSTY

What Should the Ag Mech Curriculum at the University Include?

Victor Beckum stated in his group report that the ag mechanization curriculum at the university should be broader based than the post-secondary program. Courses in other areas of agriculture such as plant and soil science, etc. should be included with options in the program for specilization. Vic suggested that employment of graduates from the University are normally supervisory to a greater extent than technical skills. Examples of employment should be in sales, service, research, farming and/or teaching.

The inclusion of basic electronics and computer literacy were mentioned, in addition to management skills, by several participants as an important ingredient in the curriculum at the university level.

Reactor

Paul Aakre reacted to this topic with a quote from the curriculum guide for Agricultural Mechanization from a midwest Land Grant College, "the curriculum in agricultural mechanization provides training in the

application of mechanical principles to agricultural production, processing and business. It is a broad program in agricultural sciences and farm mechanization." He added, "The university Ag Mechanization program does not prepare students to become proficient technicians. However, the program should train the student in the basic knowledge required by technicians."

What Knowledge and Skills in Ag Mech Should University Students Develop?

In reference to the skills and knowledge deemed appropriate for University Ag Mechanization graduates, Jerry Nechville clearly defined the requirements suggested by his group as follows:

"The four year agricultural mechanics graduate is not a mechanic or design engineer, but rather, an intermediate link between the two. This intermediate link should be prepared with the basic qualities of both the good mechanic and engineer."

Reactor

Harry Hoerner in his reactor's report informed the conference that a comprehensive University curriculum in Ag Mechanization at the University level should include educational units in the six subject matter areas as identified by the American Society of Agricultural Engineers, namely:

1. Power and machinery
2. Structures and environment
3. Electric power and processing
4. Soil and water mechanics
5. Food processing, and
6. Construction and maintenance

In addition Hoerner and others indicated other skills should be developed and the curriculum include:

1. Mathematics, basic sciences and problem solving activities
2. Publicity and human relationship skills
3. Leadership, and
4. Salesmanship skills

What are the Major Problems Associated with the University Ag Mech Program?

The major problems identified with the Ag Mechanization program by Kenton Freberg and his group were related to:

(1) Students often have various backgrounds.

(2) Teachers are often not well prepared and have difficulty keeping up with the rapiid changes in technology.

(3) Facilities and equipment are often inadequate for up to date needs.

(4) Finances continue to be a major problem since ag mechanics is considered a high-cost program at the university. This is even more magnified with the current financial woes public educational institutions are facing.

(5) Classes are often too large for effective instruction at the university level. This occurs because facilities are often expected to generate a certain number of student credit hours.

Reactor

H. Edward Breece reacted to this topic by adding these thoughts?

"Some of the problems associated with the four year agricultural mechanics program are:

A. Shortage in the number of staff positions.

B. Shortage in the number of qualified personnel to fill vacant positions.

C. Inadequate facilities.

D. Inadequate supply of specialized tools, equipment and teaching aids; budgets do not support purchase of all that are needed.

E. Difficulty in keeping staff current with rapidly changing technologies in agriculture.

Agricultural mechanization at the four year university programs need to address the needs of five different groups, classified according to their career objectives. These groups are:

1. Those planning to become self employed in agricultural/ business or work in industry.
2. Those planning to teach at the secondary level.
3. Those already having the associate of applied sciences degree and plan to qualify to teach at the post-secondary level.
4. Those planning to continue their education beyond the Bachelor of Science degree.
5. Those utilizing mechanization courses as support to their career objectives in other disciplines in agriculture.

How Can Industry and the University Cooperate to Correct Defined Problems?

It was suggested by the group chaired by Larry Hodel that,

"More pertinent educational opportunities need to be afforded to the secondary and post-secondary level instructors by the universities, especially in some states . . . If industry can provide training, it must be informed as to what specifically is needed."

"To some extent, credits can transfer from a community college to a university, and more is probably needed. Location of university facilities in itself can lead to more difficulty in providing equiment needed to provide hands-on training, which is essential, even at the university level."

Hodel concluded, "more communication and cooperation is needed between the University and industry for the benefit of all parties; the university, industry, and students."

Reactor

Marshall Finner suggested ways and means to improve communication and cooperation between the university and industry that should be noted:

1. Send sales catalog updates to the instructor.
2. Schedule new product and service training schools so they are more compatible with university breaks and summer sessions.
3. Make sure that university professors are aware of schools, dates and places they are to be held.

INTERFACING AND ON-THE-JOB TRAINING

Interfacing on-the-job training and articulating curricula among the various educational institutions and industry could be of great benefits in achieving a superior Ag Mechanization graduate. Interfacing would seem to allow achievable standards to be uniformly established and competence testing to be employed. In general the efficiency of the general effort in Ag Mechanization instruction in the U.S. could be greatly improved.

Explore the Benefits of Interfacing Secondary, Post-Secondary School and University Ag Mechanization Programs

Bill Doerr in his group's report clearly stated the benefits of interfacing with the following statement:

> Some things about interfacing seem obvious. In providing mutual support, programs at lower levels become student recruitment areas for programs at higher levels. Teachers' recommendation and referrals can assist in the recruitment/referral process as students proceed from one level to another.
>
> Interfacing can also help to prevent unnecessary duplication and, what is equally serious, undesirable omissions from the training programs.
>
> Still another benefit for interfacing programs at the various levels is to provide for continuity. We can match the training at each level to the ability and needs of the students at the respective level.
>
> At the university level, agricultural mechanization programs broaden the student's understanding and competence in agricultural mechanization by 1) including more science and mathematics to provide a better basis for understanding the scientific principles which are applied through agricultural mechanization; 2) broading the technical competence; and 3) including courses which are more generalized and thus help the student to relate mechanization to other areas such as teaching, business, economics, and agricultural production.
>
> Interfacing can also provide for a continuity of development of the student. Students vary in the degree and type of motivation. Sometimes a high school graduate wants to go to work immediately upon graduation and later decides to return to the educational ladder. Because motivation and career objectives change, we need multiple paths and multiple entry points in the training program; and the interfacing of the ag mech programs at the various levels of our educational system provide for these multiple entries.
>
> However, when this idea was brought up, we found within our group strong difference of opinion as to whether technical credit from ag mech programs can or should be accepted as transfer credit to a university.
>
> Some confusion and strong disagreement seems to exist at this time.
>
> On-the-job training is now used by post-secondary schools and has definite benefits.

Reactor

Tom Hoerner summarized his reaction:

"The three groups need to communicate as to goals and objectives of each level and then decide how each can best meet their goals and **compliment** and not **compete** with each other." He added that the high school level should be exploratory, the post-secondary level should provide job entry-level training and the university level should fulfill two needs: 1) train secondary teachers and 2) aid in post-secondary teacher training by providing coordination of technical training through industry and related groups.

Where is On-the-job Training Needed and Beneficial?

Steve Johnson gave this list of factors that should be considered. "Following are major ares of training to be emphasized during on-the-job training:

- work habits
- personality traits
- technical competencies
- career exploration
- personal assessment
- general understanding of business operations
- preplacement orientation for student and dealer."

Reactor

George Stanek reacted with these remarks:

"The basis for need of on-the-job training should be determined by the student and/or program objectives. . ." "It is best if the students could be placed just before the beginning of the busy period of the dealership. . ." He concluded, "it is imperative that on-the-job training provide realistic experience for the student and that this training expand and increase the skills of the student."

What are the Major Problems Associated with On-the-job Ag Mech Training Programs?

Dan Schwitters' group outlined these problems:

1. The inability of students to find suitable on-the-job training employment in the ag mech field.
2. Placing students in the right place at the right time — with the right employer.
3. How can the educational institutions insure proper negotiations between students and employers?
4. Third party instructor conflict between student and employer in the area of compensation and grade point.
5. The lack of instructor time to travel and contact on-the-job trainees and employers to evaluate training programs.
6. Through the course of an on-the-job training program, what controls should be used to accurately measure progress or the lack of it.
7. Establish competency basis of education and training programs to measure skills, etc.
8. Unwillingness on the part of an employer to teach or embellish student knowledge and skills.
9. Because of the lack of knowledge, training and skills, trainees are too often placed at the degrading bottom of the "totem pole".
10. Public relations problem of the acceptance of on-the-job training programs on the part of both the educators and the employers.

Reactor

Roger A. Hansen reacted with these comments:

> My major problems with on-the-job training in the past have been with lack of continuity within the program training. Many times I have been confronted with comments such as, "I thought I was training to be a technician, not a janitor or car wash attendant." These comments cause me to believe my students are being used as clean-up type persons. Some students have even dropped from the program because of O.J.T. The training site employer may say, "I need a man fulltime. Could you work 50 hours a week now, or will I have to look for another man?" This is very tempting for the young students when money and jobs are as tough to come by as they are now. This is what I call learning or earning. What priority do we have?
>
> Another of my concerns is the time element. Many of the businesses which employ my graduates have said, "How can you train these people in such a short time to be mechanics?" My response is that I can't.
>
> Another area which has caused a problem for me is differences in technique. Many technicians use different methods for age-old procedures such as installing cylinder liners, checking bearing clearance, grinding valves, etc. When the student comes back to class and says something such as, "George down at work says why in hell do you need a sleeve puller when I've been using a big hammer for 20 years?" What do you say?

How Can Schools and Industry Work Cooperatively to Resolve Problems Associated With On-the-job Training?

Joe Poulter gave this report by his group:

1. Dealers must use SOE students whether or not they hire them later.
2. Dealers must assign educational work not just menial tasks.
3. The student should get exposure to the dealer operation before the SOE experience.
4. There needs to be a three-way contract between the teacher, student, and dealer so everyone knows what to expect.
5. The instructor must visit the dealer regularly to help them evaluate the student and the program.

The group gave several other suggestions including activity of advisory councils, employee attitude, interview preparation and wage.

Reactor

Paul Rameker had this to say:

A. Student and School
   1. Attitudes and willingness to work must be prevalent in the student.
   2. Evaluation of Students
      a. Time for instructors to do on site evaluation.
      b. Proper individual must do evaluation.
         (i.e. not a coordinator or supervisor who is totally unaware of the jobs.)
   3. Valid evaluation documents or procedures established to be utilized in grading the trainee.
   4. Don't put student in O.J.T. before he/she is ready.
   5. University may have more need for O.J.T. than do Community College or Technical Schools due to their not having as much hands-on opportunity.
   6. Schools must get out and **sell** the O.J.T. program to dealers on benefits they can derive not as other time and dollars commitment of already precious entities of the dealer.
      a. Merits of evaluation of a potential employee at part time wages instead of at full time rate.

B. Industry
   1. More local dealer cooperation.
      a. Right job at right time.
         1) If hydraulics were studied, students should work with hydraulics.
         2) Do not use an individual to plant shrubs and do the landscaping and never touch the mechanics end of the business.
   2. Don't pull the student from the program prior to their completion of the program (i.e. for full time employment).
   3. Many dealers can use students for the summer or weekend employment instead of the direct O.J.T. type program.
   4. Payment should be at a rate agreed on prior to utilization of the student.
   5. An individual at the dealer that is directly responsible for the direction of O.J.T.
   6. Dealer personnel to aid O.J.T.'s learning and not hinder his progress by being closed minded and afraid of their position.

Reaction to Entire Session

Forest Bear had an introspective reaction to the entire session and presented food for thought to both educators and representatives from industry. He suggested that our educational system is good and in general we are well prepared with educational materials. The major problem he noted was **a decline in the attitudes toward excellence.** Bear stated that we should determine "what is right instead of who is right."

Such traits as honesty, pride of workmanship, social acceptability, acceptance of responsibility, work habits and your word is your bond should be developed in youth. A nationwide attitude adjustment from the corporation to the small family business and from the university to preschool program will lead to resolving curriculum problems and preparing people for today and the future.

"It was significant that so many (individuals). . . actually began to communicate. Too often in the past this communication has not (existed)."

Kenneth Ross
Instructor, Ag Mechanics
Des Moines Area Community College

FUNDING—ALWAYS A CHALLENGE

Session Summary

by

Dean Byerly, Session Chairman

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The goal of this session was to discuss how funding affects staffing, salaries, equipment and facilities.

FUNDING SOURCES

Allen Linster said, "Industry has been used extensively in providing in-service to the staff of the Agriculture Mechanics programs in Wisconsin. The major companies and specialized manufacturers, such as Diesel Injection Pumps, have all been most cooperative in providing in-service on the latest developments in the industry and providing a continuing updating on service and new equipment through several communications media. Federal and industry funding has been used to help finance curriculum development, preparation of teaching and student workbooks, along with a wide range of teaching aids.

The major sources of funding are in the hands of the local districts and part of the political process with the legislature determining local mill rates and state aids. Vocational and technical education needs to be more active in that process if it is to keep or increase its present level of funding."

Reactor

Vic Lundy agreed with Mr. Linster's presentation, "Mr. Linster, you have covered well the funding sources used in your state and in general most states represented at this conference." He added that, "The most critical area that lacks adequate funding would probably be equipment for upgrading, replacement and new program startup. He concluded, "This is why we feel it is imperative that staff at all levels in our educational institutions become well acquainted with their state and national legislators, keeping them apprised of the critical need for up-to-date equipment for our vocational programs. One of the best sources for equipment and expertise pertaining to the technical aspects of our programs has been industry. We would hope to continue this relationship by keeping business and industry informed and involved with our programs."

HOW COMPETITIVE SALARIES ARE DETERMINED

Don Schwarz said, "It seems a common practice in post-secondary to place heaviest emphasis on an individual's practical experience as the primary qualifier for teaching. I learned that an individual could be employed strictly on the basis of work experience and could advance to the top of the salary schedule without ever earning a degree."

Salary levels are determined by bargaining unit and management negotiations. The degree of need for instructors of Agricultural Mechanics, or any other single discipline, does not weigh significantly in establishing that salary schedule. Thus, as administrators we must, when filling a position, find individuals who meet our qualifications.—Our challenge is to find top quality instructors.

Reactor

Dwight Mobley reacted to Don Schwarz's remarks by stating, "I have personally found it far from easy to employ non-degree people and find their place on a salary schedule that will (1) be competitive with salaries in industry and/or (2) provide a desirable salary increase each year of satisfactory service."

He concluded, "It is not unusual to find instructors employed because of their work experience in industry thrust into such responsibilities as lecturer, program coordinator, counselor, and program developer. Reimbursement for these responsibilities should be competitive."

HOW DO WE KEEP OUR STAFF UP-TO-DATE

John A. Votca said that, "The only way to operate a vocational-technical educational program is through a technologically competent, enthusiastic instructor with the proper tools, equipment and facilities." He added, "An enthusiastic instructor who understands and is proud of his or her talents and an instructor who wants to turn out a top quality product is the type of instructor who will relate to the trade being taught. This highly-motivated instructor will seek out all avenues for keeping up-to-date."

Reactor

Harold Swanson reacted to John Votca's remarks by stating, "Some additional methods of keeping our staff up to date are:

1. College In-Service - including improved teaching techniques, advising and recruiting methods.
2. Industry Service Schools - to provide update on specific equipment possibly held during summer, or O.J.T. for instructors.
3. Find out training needs when on O.J.T. visits with employers and incorporate these into the curriculum."

"An updated instructor is an enthusiastic person who is much more effective in his job because he has a feeling of personal worth."

WHAT FACTORS AFFECT EQUITABLE TEACHING LOAD?

Brian Telander discussed many factors that affect teaching load. Some of the factors he mentioned were: type of class being taught — lecture or laboratory; instructor having to collect "live" machines versus simulators or dummy equipment; whether the class is scheduled over a semester or a condensed block of time; how many times the instructor has taught the class; number of instructors in the program; and several others.

He added, "The instructor's initiative, attitude and enthusiasm toward his job are important factors," that affect perceived work loads. He concluded with, "Many of the factors are nebulous, hard to measure and almost impossible to get on paper. When loads are being considered, it takes someone knowledgeable of the factors that are involved and knowledgeable of the instructors to be able to give equitable loads to all persons."

Reactor

Craig Morton reacted to Brian Telander's response by agreeing, "It is difficult to establish a standard by which to judge teaching loads." He added, "Although it is tempting to compare and contrast a teaching work load with industry standards, it is probable that a more realistic comparison and contrast could be made by examining work loads at other educational institutions. However, even using this approach we can easily discover pitfalls. There are a large number of factors that affect teaching load and these may vary considerably among the various institutions as job definition and mission change."

POST-SECONDARY EQUIPMENT AND FACILITIES—SOURCES OF FUNDING

William Hohenhaus discussed several sources of funding for equipment and facilities in our community colleges, technical colleges and area vocational-technical institutes.

> Federal funds and state appropriations for vocational education are commingled and find their way into a funding formula for post-secondary equipment and facilities. These may be categorical or block grant dollars.
>
> Local educational agencies may levy to generate dollars for equipment and construction. In the majority of cases these funds are supplemented with state and federal funds. Also, student tuition may supplement federal, state and local resources. The private sector makes a sizeable contribution to educational institutions in the form of equipment to be utilized as teaching aids.
>
> The possibility of generating new resources for equipment and facilities, in our post-secondary institutions, is remote. However, we must become more political and work more closely with industry to acquire adequate operational resources. We must redesign our delivery system by cooperating with other institutions and offer programs to students in the format and at the location that is convenient to better utilize our limited resources.

Reactor

Larry Case reacted to William Hohenhaus' presentation by stating, "Bill has outlined the sources of funding which are commonly used by our public institutions. Basically, they include Federal, State, and local public funds, and private grants and aid. Funding for facilities usually include some type of bond approval and selling activities. We have been in an area of abundant funds. Now we must become better managers in order for us to accomplish our purposes. We must plan our work, and work our plan. We must become even more accountable, so that when we request support from either public or private sources, our requests will be met with success.

POST-SECONDARY SCHOOL EQUIPMENT AND FACILITIES WHAT ARE FACILITY AND EQUIPMENT NEEDS

Richard Lindhardt said in this presentation, "The facility requirements of the new curriculums in agicultural mechanics cannot in many respects be met by the existing facilities designed for the production agriculture curriculum. The equipment and buildings needed for the new curriculums are also quite different."

He added, "There are many challanges that face agricultural mechanics in the 1980's. Some of these are:

1) build costs,
2) availability of funds,
3) declining enrollments,
4) relationship with industry,
5) flexibility of facilities,
6) space/student for agricultural mechanics,
7) remodeling and adapting existing facilities, and
8) cooperative research on facilities-equipment placement-time and motion studies.

He concluded, "Agricultural mechanics should be planned, organized and facilities designed to 'maximize learning, minimize student-teacher effort and minimize wasted time and motion' at the least cost."

Reactor

Forrest Bear reacted to Richard Linhardt's presentation by saying, "I don't expect a big decline in the cost of labor, architects, engineering and other raw materials. I do expect a decrease in interest rates which will most certainly lower the cost of building."

"Decreased enrollment is occurring in our classes with fewer students, maybe our shop facilities will finally meet the requirement of 150 square feet of free floor space per student. Let's get away from the syndrome of jumping through the general educators hoop of regulations and concentrate on what we know how to do best—the education of students who have a marketable skill and can become employed.

He concluded with, "Good educational programs financed by the school districts must become the result of backbone not wishbone. If you have a product which will sell, your requests will stand on their two feet. If you have the 'give me' attitude, the taxpayers should ask, 'What did you produce with the last shipment of funds?' Too many educators talk accountability and their analysis of accountability is where they spent the money rather than what did they produce with the funding.

Attitude adjustment is needed for many. Education is not an expense—it's an investment in the future."

EQUIPMENT AND FACILITIES—
STAFF INVOLVEMENT IN PLANNING

Donald L. Ahrens discussed his ideas for staff involvement.

"The administration and staff of post-secondary schools have many responsibilities, one of which may include facility planning and equipping. Staff members bring to their job a wealth of background experiences and ideas. These should be used when planning for new equipment and facilities.

Each building process will vary, but the following is a number of steps that might be used in the planning process.

Step I - A meeting should be held to lay out the general plan and set up a timetable. Each staff member should consider this area and develop what he considers his needs for both facilities and equipment.

Step II - At subsequent meeting this information should be gathered, consolidated and put into a workable plan. This information should be discussed with the architect.

Step III - Architects plans should be reviewed with the staff. Scale models, translucent drawing paper (for scribbling change) laid over the top of the plans, etc. aid in arrangement and placing of equipment electrical outlets, heating and air lines.

Ste IV - Staff can be involved in equipment purchases. They can do a great job of writing "specs" for equipment as they will be the ones using it.

Involvement of the staff provides motivation. The staff will be concerned that a well planned facility is built and that it is efficiently equipped.

Reactor

Phillip Martinson reacted to Don Ahrens presentation by adding, "A serious look at site planning in relationship to easy access and aesthetics are a must for educational facilities. Staff can help a great deal when it comes to easy access. They must have input since they are the ones who must load and unload equipment in all types of weather. Movement of the machinery, whether loaded or transported, must be reviewed. Watch for overhead obstructions, both in the movement area and assembly areas.

My last comment is take time. Take time to let your staff and supervisors plan and visit other facilities. Look not only at educational facilities but dealerships which have been constructed in the last few years."

FUTURE CHALLENGES AND OPPORTUNITIES

Session Summary

by

Louis Hathaway, Session Chairman

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The purpose of this session was to look at what technology may hold for future ag machinery technicians.

Also a presentation was made on how educators are going to cope with new technologies and a greater instructional burden without adequate support of several resources.

WHAT IS IN STORE FROM INDUSTRY

Robert Wismer discussed changes in technology.

> Agricultural machinery has become more complex but simultaneously more productive and more reliable through the introduction of new technology. Energy, economics and electronics will exert a major influence on the rate of adoption of new technology in future agricultural machines. Electronic monitors and controls, planetary drives, new materials, more sophisticated hydraulics and diagnostic equipment will all find a place in agricultural machines during the remainder of this century. The service technician/mechanic plays a vital role in the successful introduction of new technology to farm machines. An understanding and familiarity with the principles of basic electronics, hydraulics, power transmission, and material properties are essential to the diagnosis and repair of modern farm machinery. The formal training of service technicians, in addition to providing a sound understanding of these principles, must also instill the ability and desire to continue to learn after leaving school. This will ensure the ability of the service technician to adopt and adapt to new technology during a forty year career.

REACTORS

Roland Espenschied reactetd to Mr. Wismer's presentation with these remarks:

> The future as outlined by the industsrial representative, Mr. Wismer, will be affected primarily by energy, economics and electronics.
>
> The service technicians who attend our classes must be thoroughly trained in basic hydraulics and electricity so they can adapt to new developments in these fields.
>
> The challenge for technicians and their teachers is clear. We must teach these technicians to master these new developments and instill in the teacher a desire to continue to learn and to stay abreast of new developments. We must develop a thirst for knowledge and encourage in our students a fascination with the challenges of the future and a desire to meet and master these intellectual challenges. Our job just be to teach basic principles coupled with a confidence and spirit of adventure that will help them meet whatever problems the future presents.

Louis Hathaway reacted to Mr. Wismer's remarks and said:

> All this new technology will require students who are not only good with their hands, but good with their minds. To become one of these future technicians will require that the student and technician have as much education and training as possible on a continuing basis. No longer can the student technician be weak in academic studies. And these new technologies will require a great deal more study, classroom instruction and hands-on experiences than presently required.
>
> The ability to accurately diagnose failures will become more important as equipment gets more complex and expensive. Diagnostics cannot be trial and error propositions, but must follow logical and orderly steps to find the causes of failures efficiently and accurately.
>
> Hathaway concluded, "In the future the volume of knowledge that the individual wil have to learn may be overwhelming if eduation fails to recognize industry's need for technician graduates who are well educated in technology.

HOW ARE EDUCATORS GOING TO COPE WITH THE FUTURE?

Ron Williams said, "The successful relationships between industry and education of the past will not suffice for the future. The nation is in the midst of an industrial revolution more profound, due to the rapidity of change that we face, than that of the 1800's. The grass roots relationship between industry and education will determine the future industrial and business success of our country."

He added:

> During the period of radical change in our nation's labor/work relationship, the country has no national policy on reindustrialization, it pays unemployment compensation to an idle work force, and not tuition to those who desire retraining. For the jobs that exist today, we have too many workers and for the jobs of tomorrow we have a lack of workers.
>
> Ag Mechanics curriculum now must include computer technology applications yet instructors have no means of gaining the knowledge they are to teach to future technicians.
>
> Industry needs to provide education liaison personnel to work with the colleges, and funds to support education of ag mechanics teachers, and workshops to keep them up-to-date.
>
> Educators need to be more aggressive to pursuing a strong relationship with industry. Educators need to renew their commitment to a strong industrial relationship.

REACTORS

Roland Espenschied responded:

> We must use continuing education programs to keep up to date and develop the same attitude in our students so they continue to learn. Our communities need their contributions as citizens in churches, schools, etc. as well as their professional service to the farm equipment industry.
>
> Our students will do many things as we show them and tell them, but they will mostly do as we do, so the challenge to educators is really great.
>
> I would suggest that membership and active participation in professional groups is a way of staying up to date, of making industry contacts and improving instruction. I am referring to Amer. Voc. Ass'n., Amer. Soc. of Agr. Engineers, Voc. Ag. Teachers Ass'n. and Amer. Diesel Society to mention a few.

Louis Hathaway agreed with Mr. Williams, "Mr. Williams' points are well made. It amazes me that we expect a student technician to learn in two years all the basics that many don't learn in four years. Is our educational system constrained by peremptory rules that prevent an adequate education of the technician?"

He concluded", technology is a rapidly growing knowledge and development base. It cannot be correlated with a pure academic curriculum such as liberal arts where the knowledge base is not rapidly changing. If the technician is not performing adequately because of education, it is not the fault of that individual. . .it is ours, education and industry."

CLOSING REMARKS

John Conrads summarized his preceptions of the conference.

> From all the remarks we have heard we have to conclude that your expectations were met or exceeded. We are also very pleased with the outcome. Yet, the future will have to reveal the real results.
>
> We believe that the need for training our young people was very well documented and agreed upon. We believe that the many frank exchanges of ideas pinpointed the need for much closer cooperation between the various educational functions, industry and potential employers. The recognition that we cannot train future technicians by using antiquated methods was of significance.
>
> It was certainly of significance to recognize that the job market calls for far more trained technicians than our present system is capable of producing.
>
> It was recognized that future success depends on commitment to the cause of ag-mechanics training. All of us must become ambassadors of this cause. But, we believe that each of us can make a difference in our individual environment if we have the will. . .the "doggedness". . .to succeed. Success will be the result of working hard ouselves, and in close partnership with others who have the same goals.

William Doerr summarized his thoughts on the conference.

> There were several successes; the most obvious of which is the overall organization and plan of the conference. The selection of the participants provided an excellent blend of personnel to bring various view points and to have an exchange of ideas.
>
> The topics were most timely; the administration of the program, the carrying out of the plan was quite precise—the committee proved that the plan, as it has been prepared, was workable. Obviously these successes didn't just happen. Our thanks go to Lou Hathaway and to his conference planning committee. Also our thanks to Deere & Company for their financial and personnel support given to this conference. The financial support was major but I think the amount of personnel backing that was given is even more significant.
>
> And, of course, thanks go to all the participants. The workshops, the reports of the workshop activities, and the reactive format gave many persons an opportunity to participate in the conference and contribute in the overall effectiveness.
>
> Mr. Doerr reviewed some of the highlights of the conference and then added, "The medallion which we were given last evening might be the nicest thing about this conference. This medallion can remain on our respective desks as a constant symbolic reminder to remain committed to our respective task as it relates to the training of agricultural technicians for the future.
>
> He concluded, "I challenge you, the participants, to keep this medallion on your desk as a constant reminder of your commitment to the partnership which was reaffirmed and redirected at this conference.

Donald Schwartz gave some of his observations by discussing educators.

> Who are we?
>
> - We are, in my judgement, a group of educational renegades who focus on **training** rather than education. We are probusiness. We know that profit is not a four letter word. We are proindustry. We fill a long overlooked void in the American Educational System.
>
> I know that some of your schools too have been contacted by similar organizations within agribusiness. It suggests an exciting future:
>
> - I envision that in the years ahead, our existing one and two year programs which are now of good quality will get better.
>
> - I see our retraining and upgrade training programs developing in most vocational/technical schools throughout the country.
>
> - I see us networking our outreach programs across district, state, and national borders. We are doing this now in our dealership business management training.
>
> - I see us extending our outreach training beyond the farm equipment industry into several other segments of agriculture and agribusiness.
>
> Why is it going to happen? Why is it happening?
>
> - Because we can do it better. We focus on training. We produce results.
>
> - Because businesses and industries are willing to support and purchase quality training which produces results.
>
> In partnership, business, industry and vocational/technical training will make this happen.

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INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

(Session Chairman — Louis Hathaway)

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INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

THE CHALLENGE OF PROVIDING GOOD CUSTOMER SERVICE

Robert A. Sohl

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Good morning, I'm especially pleased to be here this morning and participate with you on a very important topic — vocational education. My life-long occupation has been in customer service and I'm happy to be associated with a Company where the care of our customers is seen to be paramount to our continuing business. This is not always the case in consumer/business relationships as all of us know too well.

But providing good customer service is becoming a more challenging task, and that's the topic I want to dwell on this morning. I wish I could say that we at Deere were completely happy with our service support capability. Even though we do better than most, and we're proud of this, there continue to be situations where our customers are not happy with us. We still get some nasty letters; too many telephone calls; and our failure frequencies on some products are higher than we would like. Try as we may, we still don't build the perfect product.

How do we provide the kind of service our customers expect and deserve in the coming years? Well, it's certainly not by being satisfied with the status quo in our present approaches to customer service.

The first Director of Service at Deere, Fred Hilemat, coined an expression about 15 years ago which is still relevant in 1982. He said, "Today's products serviced by yesterday's methods mean a doubtful tomorrow." I'd like to add my own correllary: "Tomorrow's products serviced by today's methods will probably bring in Japanese competitors." This may sound trite, but the automobile people don't take it so lightly today. The imports moved in where our own industry failed to anticipate or respond to customer needs.

One of our advertising slogans over the past several years has been "service is the other half of a great product." We really believe this and I think our position in the market bears testimony to that fact. But nothing remains static. Farming conditions and farmer's needs have changed dramatically in recent years. So have the products they use. And with these changes comes the need for better product support.

In the next few minutes, I want to talk about customer service and I'll start by identifying those principal elements which have the greatest impact. I want to expand a bit on each of these items and then discuss those aspects which are pertinent to this group.

The first group of elements shown below all relate to the inherent characteristics of the product itself — its design, how well it's manufactured and how well it meets the customer's needs.

Product Characteristics

Design
- Size (Productivity)
- Complexity
- Features

Reliability
- Quality
- Failure Frequency

Performance
- Quality of Work Performed
- Convenient to Use

Obviously, the highest degree of customer satisfaction is achieved when the product meets all of the customer's performance needs and never breaks down. Such reliable performance is suggested by the Maytag commercials that show the lonesome and bored Maytag repairman. I'm happy to say that we have some products which parallel that level of reliability, performance, and customer satisfaction. These are a serviceman's dream.

But the challenge continues toward the development of machines which do more, and at the same time, perform to both our and our customer's expectations. These products get bigger, they incorporate more features, they're often more complex, cost more and have tremendous productive capacity. Unfortunately, these characteristics

tend to adversely impact what the customer expects in service support and what we can provide. Let me illustrate this phenomenon with two examples, one on the basis of product size, the other on features.

Let's compare the productive performance of a current 8820 Combine equipped with a 12-row corn head to that of a Model 105 Combine with 4- or 6-row head of only a few years ago. Both represent the largest machines at the time they were produced. Compared to the Model 105 Combine, the 8820 requires at least twice the field support in trucks, wagons, manpower, etc. to haul the grain away and keep the combine operating. This machine has the capacity to harvest 50 bushels of corn in one minute. It will fill the 220 bushel grain tank in four and one-half minutes. What's the impact of one hour of downtime? Of ten hours as the result of a major failure?

We asked these questions in 1978. And with the help of outside consultants, we evaluated many aspects of a product support strategy. Not surprisingly, survey results showed that downtime was becoming a predominent concern of customers, particularly during planting and harvest seasons. Of greatest significance, however, was the actual cost of downtime during these critical periods. Costs, of course, vary with the particular circumstances involved, but a range of $200-$300 per hour was quite typical for a 7720 Combine. This is one size smaller than the 8820. Such costs probably range from $300-$400 per hour for the 8820. Is it any wonder customers become impatient with us when we don't provide immediate solutions to their problems?

Now let me switch gears and address the impact of machine complexity on product support. The electrical and hydraulic circuits for a current 24-row planter (see Exhibits 1 and 2 on page 4) have nothing to do with the planting mechanism itself or with the electronic seed-rate monitors which have almost become standard equipment on modern-day planters. Nonetheless, these electrical and hydraulic systems are essential to the operation of the machine in that they control the raising, lowering, and folding functions. A failure of an element in these systems is in all probability a downtime failure -- a challenge to both the engineer who designed the machine and the service technician who is expected to provide a quick solution.

I'm sure you understand that we don't make our products complex just for the sake of complexity. But as equipment sizes increase and more features are added, the likelihood of a downtime failure increases as well. Customers want these features -- they need to fold these large planters to get from the field; they want to vary and monitor the planting rate from one end of the field to the other; they want quiet cabs on combines and tractors to keep out the dust; and they want air conditioning when it's hot. Who fixes these systems when failure occurs? Can we really expect a dealer's serviceman to be proficient on such complex and varied apparatus?

All of which brings me to the second group of elements which affect customer service. These elements are shown below and relate to the delivery of these support services.

Support Characteristics

- Technical Competence
- Parts Availability
- Timeliness
- Facilities and Equipment
- Attitudes

In our case, and with others in the farm equipment business, this support is typically provided by an independent dealer organization. Note that each of these elements in one way or another is largely dependent on human involvement and intervention. All of the people at the dealership must make it happen, from the manager to the person answering the phone. I need not go into detail how all interact in a way to make it happen right -- the way the customer wants it and the way the dealer wants it. Let me focus only on the dealer service technician because that's of particular interest here and to a large degree, the focus of this conference.

Most of you are well aware that this industry needs more, many more qualified technicians. Dealers have lost a significant number of their good people to more glamorous and better-paying industries. And the significant switch from gasoline to diesel engines in the automobile industry has literally stripped our dealers of their skilled diesel technicians. Surveys continue to reveal annual turnover rates of 10% to 30% in dealer service technicians. We need more people -- but we also need better people. People who can understand, diagnose, and repair complex and sophisticated systems. I cannot overemphasize the need for the intelligent, well-trained, and highly-skilled technicians -- a technical diagnostician, if you will. This requires not only talent for being a good "wrench jockey," but also the mental abilities to understand complex systems. It requires an ability to analyze the many factors which can contribute to a product failure. These people cannot be the cast-offs and drop-outs who "can't make it" in other academic pursuits!

Let me illustrate this need through the results of a six-month study completed earlier this year. This study was done by Captain William Wier, an Army officer assigned to us for one year in the Army's "Training with Industry" Program. This study included involvement with both agricultural and industrial dealers and its principal focus was on the evaluation of diagnostic capability. In order that there is no

misunderstanding, let me remind you that we don't believe 100% diagnostic accuracy is achievable. But wherever diagnostic and repair error exist, somebody pays -- either in excessive repair costs, excessive downtime, or both; and even in the loss of future product sales. I would like to show you a very brief summary of the results of this study.

Let me say at the outset that the study was sufficiently broad in the coverage of dealers, technicians, work orders, and other data to make it statistically valid. It becomes obvious from this study that diagnostics are becoming a more significant part of the serviceman's job. For example:

Diagnostic Requirements

- 18% of all jobs performed required some level of diagnostics.
- 40% of these required more than 2.5 hours of diagnostic time.
- 60% of these were within 2.5 hours of diagnostic time.
- Hydraulics and electrical systems, not surprisingly, caused the greatest amount of diagnostic difficulty.

In order to make some assessment of diagnostic accuracy, we asked for the return of certain electrical and hydraulic components which were reported failed under warranty. All of the returned components were tested and analyzed to determine the nature or cause of the reported failure. If the component had not failed, it was identified as a "no-fault" and it is presumed that a diagnostic error was made. Obviously, we cannot precisely correlate "no-fault" returns to diagnostic error because of multiple failure modes or "intermittent" failure symptoms. Nevertheless, following are some reasonable indications of the challenge facing us.

No-Fault Electrical Returns

Component	No. Returned	No-Fault No.	No-Fault %
Control Module Harness	28	3	11%
Magnetic Pickup	4	3	75%
Transmission Control Box	11	4	36%
Grader Control Box	59	20	34%
Hour Meter	21	17	81%
Sensor	23	4	17%
Electrical Solenoid	7	4	57%
Circuit Control Module	6	0	0%
Brake Light Switch	41	4	10%
Miscellaneous	15	4	27%

No-Fault Hydraulic Returns

Component	No. Returned	No-Fault No.	No-Fault %
Main Hydraulic Pump	59	16	27%
Hydraulic Valves	374	66	18%
Poppet Valves	32	2	6%
Accumulator	7	1	14%
Attenuator	11	10	91%

The chart below summarizes the no-fault returns on both electrical and hydraulic components and includes one engine element, the turbocharger.

No-Fault Summary

Component	No. Returned	No-Fault No.	No-Fault %
Total Electrical	215	63	29.3%
Total Hydraulic	483	95	19.7%
Turbochargers	158	51	32.3%
TOTAL	856	209	24.4%

The above data suggests that approximately 25% of the reported component failures are the result of diagnostic errors! These errors obviously account for a substantial amount of dollars in excess repair costs. But more importantly, the excess downtime to the customer may be even more costly.

I use this example to make the point that future dealer technicians need to be far more capable than their predecessors. I don't intend to find fault with the present staff. And obviously, we can do more in machine design and manufacture to make them more reliable and easier to diagnose and repair. I'm happy to say that our management and engineers are dedicated to that task, but as products change, so we must change.

The challenge for providing good customer service is a substantial one -- one that we can't do alone, one that dealers can't do alone, and one that the vocational education community can't do alone. That's why we're here, because maybe through this conference we can set the wheels in motion for that partnership which can get the job done. It won't happen overnight. We should be encouraged, however, that more and more people in our business not only recognize the problem but want to do something about it. At the National Farm & Power Equipment Dealer's Association Annual Convention held in August this year, W. H. Houston a farmer from Mississippi told the 800+ dealers present, "A few years ago it was more economical to trade than to repair; now it's just the opposite. If I were a dealer, I'd be more concerned abut my Service Manager's health than my Sales Manager's."

Customers want good service. Dealers want to provide it. What often stands between this need and the ability to respond are good, qualified people. We believe that our best source is the community college or trade school. Maybe this is the only source, because few dealers have the time, resources, and discipline, and sometimes desire, to train their own. We need each other and I believe this conference will demonstrate that need.

In conclusion, let me challenge each of you to share your experiences of this conference with others -- your peers, your supervisors, and other key people. Our success can only come about by the momentum that is maintained after you leave here. Let's make it an ongoing crusade that is marked by this conference as a beginning. I hope the events of the next three days will provide that renewed challenge for all of us to affect change and that we can look back and say -- "This is a great partnership!"

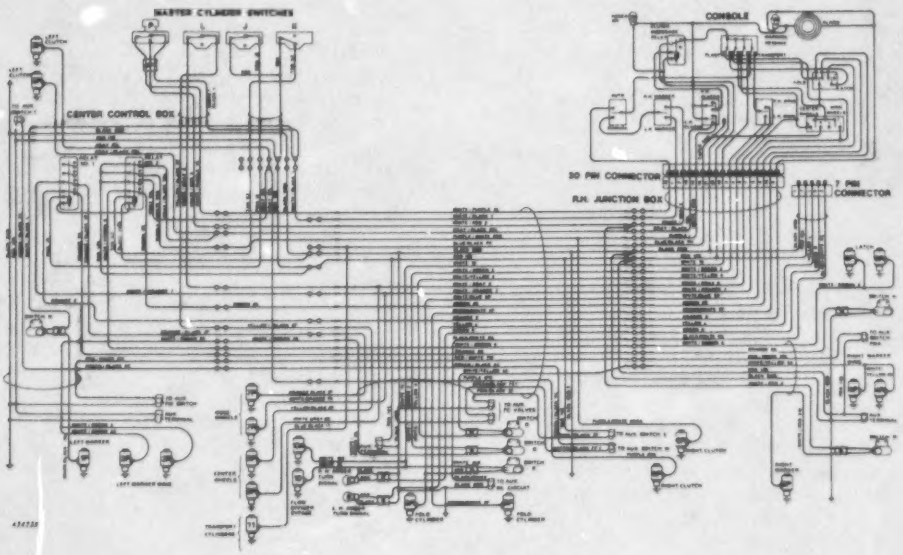

Exhibit 1 -- Electrical Schematic

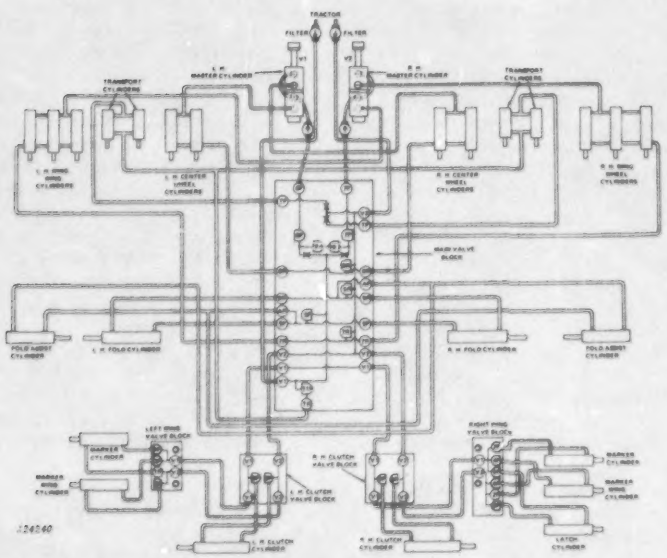

Exhibit 2 -- Hydraulic Schematic

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

TEACHER TRAINING OPPORTUNITIES IN INDUSTRY

L. J. Hodel

L. J. Hodel
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I am pleased to have this opportunity to address this distinguished group of educators. I will briefly discuss Agricultural Mechanization teacher training opportunities in industry. As you might suspect, most of my comments will involve such opportunities as they pertain to John Deere and John Deere products.

First, the various John Deere Company branches across the U.S. and Canada offer schools and training sessions for dealer service technicians. At some of the branches, including our branch at East Moline, we send invitations not only to dealer service managers and service technicians, but also to Ag Mechanization instructors at all community colleges and universities in our two-state area that have a viable Ag Mechanization program. This includes every series of schools that involves technical training of our John Deere agricultural products.

We believe this offers the best opportunity for these instructors to get the latest technical information from industry. Their attendance with dealer technicians also allows them to get the experience of people who are involved in working with the products and technology on a daily basis. They get not only the theory and all the positive aspects of the product design and manufacture, but the questions which come from the field as well.

I believe this makes such training more meaningful and more useful to the instructor. We have numerous participants in these schools. We can accommodate many more. We appreciate the Agricultural Mechanization instructors who attend, and we believe the sessions are very beneficial.

Some other John Deere sales branches do not invite Ag Mechanization instructors to the same training sessions that dealer service technicians attend, but rather have special training programs just for the community college instructors. I am very confident that any of the branch service training departments will consider any reasonable request for special training that is desired by you people who are directly involved in Ag Mechanization. If you believe there is a need for such a special training session, you need to ask for it. The various services that I have discussed are all provided, of course, at no charge to the educational institution. We provide certificates for credit for the individual instructors that participate in the training sessions, so that where appropriate, they get the deserved credit for the courses that they satisfactorily complete.

The John Deere Area Service Managers, John Deere's service personnel in the field, are responsible for the service needs of approximately 20 dealers in the area in which they live. They periodically call on each of these community colleges and universities that have Ag Mechanization programs in their areas of responsibility. This would be at least once, generally at least twice a year. We also encourage educational institutions to contact the local Area Service Manager whenever there is a reason to do so.

The Area Service Managers conduct at least six training sessions per year for each of their dealers at the local level. Some of these sessions are appropriate for community college instructors, and provide additional training opportunities close to home.

We have from time to time offered training sessions to community college students in exchange for use of community college facilities for dealer service training sessions. There are many possibilities that can be of benefit to education and industry, and by our communicating openly we can better fulfill our mutual needs.

We encourage communications between schools having Agricultural Mechanization programs and local John Deere dealers. Farm equipment dealerships provide one of the best locations for placement of community college graduates. Many such schools have on-the-job training (or OJT) as part of the requirement for successful program completion. We support the OJT wholeheartedly and believe this is one of the most effective ways of really making the educational process effective. Students must demonstrate what they have learned in actual on-job work situations.

There is opportunity for community college instructors to broaden their training and experience themselves at local John Deere dealerships. A very effective way of doing this, which some community college instructors do use, is to spend one to three months working

at a local dealership during the summer time for those instructors that have less than a 12 month teaching contract. This enables the instructor to get direct hands on experience and to keep up to date in all aspects of the farm equipment business, as well as to earn supplemental income.

We encourage John Deere dealers and John Deere employees to participate in, to get involved in, and to support in any possible way the Ag Mechanization curricula at all the community colleges and universities in their areas of responsibility. Many of our dealers, some of our Area Service Managers, and other people in the organization serve on advisory boards, advisory committees, etc. to provide aid and support wherever possible. I have personally been involved in the state-wide Ag Mech Advisory Committee of the Illinois Association of Community College Ag Instructors for the past seven years. We at John Deere believe all of these cooperative activities can only lead to improvement and betterment of the Ag Mechanization programs offered and result in better qualified Ag Mech graduates.

While everyone these days is very concerned about costs and budgets are limited, we believe that educational institutions, in general, should look into ways to better support the individual instructor in taking advantage of these types of training opportunities. We believe it is appropriate to provide compensation for and to pay necessary expenses for the instructors to take in such appropriate training. The only way the Ag Mechanization students are going to be up to date on current technology is if their instructors are up to date on that technology; and we believe the only way that's going to happen is for a community college instructor to periodically attend the training sessions offered by industry.

If there are any of you educators here who represent an institution with a viable Ag Mechanization program that does not have regular contact by John Deere in some form or another, please see me or one of the other appropriate personnel to make sure we get you on our mailing lists and on our calling lists. I challenge you also if you have what you believe a legitimate need for a certain type of service training, which is not currently available, or has not yet been made available to you, please ask for it. We'll do our best to accommodate your needs.

Let me summarize briefly. We need the Agricultural Mechanization graduate, the product that you turn out. You must tell us what we need to do to help you to that end.

I believe this conference and the free and open communication it encourages can only lead to better understanding and acceptance of our mutual needs, so that together we can face the challenges and opportunities which lie ahead in the field of Agricultural Mechanization.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

Reactor's Panel Response

William B. Schreck

Reaction to Remarks Made by Robert Sohl and Larry Hodel

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I truly believe a "Partnership" between Agricultural Education and Industry can be the key to the future success of both professions in the achievement of individual, as well as, common goals and objectives. We in agriculture education can provide the qualified individual to meet the current and future needs of ag industry, but we need your total cooperation—perhaps through a partnership—established here and now at this conference.

I heartily agree with the comments of the session's distinguished speakers; however, we in ag education are somewhat restricted in the development of fully qualified individuals because of limited resources. We are experiencing limited funds to provide inservice for teachers in areas of high technology, to purchase equipment comparable to modern industry, to construct facilities in which to conduct appropriate laboratory activities, etc., necessary for the instruction of technical, as well as, leadership and management skills. It is time to cooperatively design a new program through which to achieve desired objectives.

Perhaps our initial effort should be to acquire a commitment from state and national leaders to support quality programs in vocational education to meet the nation's skill-training needs. We need to tell the story of vocational education; to identify program strengths and weaknesses; and to develop the solutions to secure the resources necessary to offer quality programs to effectively prepare students for the "world of work."

In addition, we need to further develop this partnership to share advanced technical skills and to provide inservice training for teachers of agricultural mechanics. It is important that we utilize tools and equipment comparable to that being used in industry. Perhaps we could establish a plan through which industry might provide or share the equipment vital to instruction, and possibly, the most important partnership component might be to actively involve one another in the planning, development, and implementation of training programs at all levels.

We have a challenge to develop a strong partnership which may be so very important to the success of industry and education in the years ahead. That partnership must be established in the spirit of trust and cooperation during this conference and continued hereafter until mutual goals are achieved.

Industry's Role in Ag Mechanization Education

Industry's Assistance in Recruiting Students

Joe Poulter and Rollan Bonneau

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ROLLAN: As we discuss methods for industry to aid the community college in recruiting students, I believe it would be of interest to the group to know it sometimes works in reverse.

I began my working years with a John Deere implement dealer in Nebraska and, after eight years, came to work for Joe (Poulter) in Illinois. I spent 13 years at Poulter's and when they started the Ag. Mechanics Program at Kishwaukee, I was asked to teach Diesels at night. They then offered me a full-time position, and I have now been at the College 13 years.

We also hire implement dealers' service men to teach evening classes at the College.

JOE: I personally believe it would be impossible for an instructor to properly train implement mechanics if he, the instructor, had not had considerable time involved in "hands-on" experience similar to the type that Rollan has had. The success of the program at Kishwaukee College is a testament to this.

Getting back to the topic at hand, industry's role in ag mechanization education, and, more specifically, its assistance in recruiting students who would attend these program offerings, I believe that the implement dealers need to be readily available to talk to any prospective students both at the store and at the local high school. Visits to the store could be on an individual basis, with brochures available at all times to explain the programs that are offered. In addition, the John Deere dealer could provide space for representatives from the vocational school to set up a display for promotion of the program during the local dealer's "Farming Frontiers Days" programs. These programs are held once a year, usually during the wintertime, and, with advance publicity, this could be a good place for students, parents, and representatives to meet and discuss the possibilities that exist at the school that was represented.

ROLLAN: I agree with Joe on providing publicity and space for the colleges at their open house, called "Farming Frontier Days." In some instances, perhaps, the dealer and the college could hold a session at the dealership during the summer to explain the program available at the college and how the dealer views this as essential to the training of people he will be employing.

JOE: The local John Deere dealer should work actively with the Future Farmers of America in the schools and with the local 4-H Clubs and Extension representatives. They should be encouraged to invite representatives from interested ag mechanics programs to their schools to visit with prospective students. At the time of the visitation at the school or meeting, the implement dealer or his representative should be available to assist in any way so that interested students learn about the programs that are available. It should be stressed that the primary need is for ag mechanics, but that there is also a need for sales and parts people in the agribusiness of selling and servicing farm equipment.

ROLLAN: When the college instructor visits the local high school, it would be helpful if the implement dealer could also be there to speak to the group about the training the students will receive at the college and how this is important to a dealership. Students really need to learn the basic skills prior to going to work at the dealership.

I would encourage dealers to serve on the high school advisory committee, as this could help to educate the high school teacher as to dealer needs and the opportunities available for their students.

JOE: Dealers should use the co-op student programs offered by most high schools. Dealers can offer part-time employment to high school students that have expressed an interest in ag mechanization. When these students graduate from high school, they should be encouraged to

attend school for additional education and, in our case, we continue to urge the vocationally oriented student to attend Kishwaukee College for Ag. Mechanics training. One program we have used successfully has been the policy of offering the students employment during the non-school periods--vacations, summers, holidays--as long as they continued their educational program to a normal conclusion. When they finish schooling, they would either be hired, or if no full-time position existed, we would make every effort to find the student employment for which he was trained. If he were to quit school before finishing his program, his employment would be terminated.

ROLLAN: Where it is feasible, I would like for the dealer to offer the student an incentive by paying a portion of his cost, be it gasoline money, lab fees, or a flat dollar amount, to encourage the student to continue his education.

I would also like to encourage dealers to contribute a small amount of money that could be used as a scholarship for the outstanding Ag. Mechanics student at the high school each year.

JOE: The local John Deere dealer should take the lead in promoting the use of these specially trained students in any way possible. He can promote their employment by the local dealers in his surrounding area. He can promote their use at both the district and state levels of the Implement Dealers Association.

ROLLAN: I agree with this, as the dealers are more aware of other dealers' needs than the college instructors are.

JOE: The local John Deere dealer should have available at all times the necessary information concerning all types of advanced education concerning the training for ag mechanics. Most dealerships have space available where these brochures could be on display. The John Deere dealer would need to work closely with the representative of the school to set up an eye-catching display in the showroom of the dealership. It might even be possible for the dealer to indicate in his newspaper advertising that these brochures were available and could be picked up at the local John Deere store.

ROLLAN: I would like to see this expanded by including the students in perhaps sixth, seventh, and eighth grades receive some type of information on the job opportunities in mechanics.

JOE: At the time I hired Rollan to work at our store, there were no programs where I could find a replacement when someone either left or became unable to work. It was necessary for me to place ads all over the country to try to find someone with experience with farm machinery. Rollan answered an ad in the Omaha, Nebraska, newspaper and was subsequently hired to work in Belvidere, Illinois. Times have changed--we no longer look to other dealerships for mechanics to fill our vacancies. We have a terrific potential available to us in the Ag. Mechanics programs that are now offered, and we have the opportunity to help train our future employees. We need to work with this valuable asset in every way possible. The future of any implement dealer depends on a quality product to sell, but it also depends on the man in the shop who can maintain this quality product. More than ever before, these sophisticated machines need sophisticated technicians. Let us all work together to make sure that these programs now in place continue and improve.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

INDUSTRY'S ASSISTANCE IN RECRUITING

Larry G. Munton

Reaction remarks made by Joe Poulter/Rollan Bonneau

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The comments of Mr. Bonneau and Mr. Poulter offer some positive and important steps offered by industry.

Since Joe pointed out that we're married, I hope you will take these comments in the same spirit a married couple criticizes one another and at the same time still stay in love, and at the end stay together with both better for the experience.

Points:

1- There is a lesson to be learned from the private schools. They are enrolling students at three to four times the tuition of public schools.

2- There seems to be a good bit of confusion over the "raw materials" that we are recruiting. What type of student should we recruit to meet the needs of industry and what do we do about the student who wants training but may not be able to be a top technician? We need an entry level test to help us measure:
   a. The minimum level of academic skills required by students.
   b. Manipulative skill.
   c. Attitudes
   d. Intelligence

   Who should provide the leadership? Industry should take the lead on identifying their requirements and higher education should provide the research and data to assist them.

3- We have a problem of shrinking Vo-Ag departments and Farm Populations. This may require us to look at non-farm population as the human resource dwindles. This will bring about a whole series of new problems for industry and education.

4- We have to make our story known to the counselor and others advising students. They often perceive the 4-year college or university as the only avenue for success. We need to divert those "good" students toward the community college and toward technical programs.

5- The college needs to clarify who recruits; counselors, administrators, instructors, or specialists. Then we need to introduce instruction in marketing techniques to the parties involved.

6- Recruitment will be aided immensely when industry figures out why unskilled factory workers start at $12.50 per hour and skilled technicians with a sizeable investment in tools and education start at $6.00. I should add, that I am not suggesting that only salaries for technicians should go up.....

Industry and Education...Partners in Ag Mechanization

Availability of Training Components For Educational Institutions

Mr. Phillip L. Lane

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Good Morning!

On behalf of John Deere Company of Minneapolis, I would like to welcome each one of you to Industry and Education, Partners in Ag Mechanization. This conference is a first. I am sure it will benefit both education and the agricultural equipment industry. A word of thanks and appreciation should go to Lou Hathaway for the time and effort he has invested to make this conference happen.

In recent years farm equipment technology has made some rapid changes. These changes have resulted in some sophisticated and highly productive farm machinery. For example: Nearly every machine produced by John Deere uses fluid power or hydraulics in one form or another. Electronic monitor and control systems are being used extensively in machines such as hay balers, corn planters, combines and of course, tractors.

Hydrostatic and hydraulic shifted transmissions are common. Air-conditioning is on most machines that have enclosed operator stations.

These systems require extensive training in the skills of working with hydraulics and electronics, as well as air-conditioning systems. Twenty-five years ago skills in these technologies were not even considered for farm equipment technicians. These technologies require highly trained and skilled technicians to efficiently diagnose and repair the complex systems that make these machines work.

It is essential for you as technical educators to be well informed on these technologies. Your students must be able to put their hands on equipment which represents the very latest developments in farm machinery. Because equipment is costly, the use of key components in your laboratories is an economical and effective alternate training method.

We recognize that it is difficult for you to keep up with the technological advances that are occurring. We also know that your budgets for new equipment are limited. Yet, an up-to-date, well equipped shop or laboratory spells the difference between an average and an outstanding training program. When students can put their hands on the newest components and equipment available, they are motivated. They get excited about their future as farm equipment technicians.

John Deere has a program available to help you keep your training up-to-date. Before this conference is over, you will be given a copy of our catalog which lists a number of training components that are currently available. These items will up-date and enhance your training programs. They will help put you on the leading edge in the business of training.

Some examples of components that can be purchased include: John Deere manufactured items such as complete engines, complete transmissions, hydraulic system components and some electrical systems-items purchased from other companies for use on John Deere products including small engines, alternators, starters or fuel injection pumps. Sub assemblies are also available. This might be a transmission clutch pack or a final drive and axle assembly.

Your Advisory Committee should be used for counsel in determining the needs for your particular program. The Sales Branch Service Training Manager can also give you suggestions to aid in determining what components will best fit your needs and budget.

These components are available to qualified schools at one-half of list price. The only limitation is that a school is limited to no more than two items of one type in a school year. In some situations, components may be obtained for a short period of time on a loan basis from the Sales Branch Service Training Department.

Who qualifies for the special price of these components? Schools may be approved if they have an acceptable program for training service technicians and their teachers. These technicians should be potential employees of John Deere or John Deere dealers. Colleges, universities, trade and vocational schools who train these potential technicians qualify for the program. The Sales Branch Service Department makes the final determination as to who qualifies.

How do you participate in this program? First, determine your needs for components. To do this you should review the kinds of machines

that are most commonly found in the area that your school serves. For example: There is no need in Minnesota to train cotton picker technicians. However, Minnesota does need highly skilled combine technicians. Advisory Committee counsel should be used in determining what will be most beneficial to your program and the area that you serve.

After your needs have been determined, the next step is to contact the Sales Branch Service Department. In most Branches, the Service Training Manager is the person who you should talk to. The Components Catalog has a list of contacts for each region of the United States.

The Sales Branch Service Training Manager can assist you in determining what components will best suit your purposes. He may also know of some items that are not yet in the catalog that would meet your needs.

After you have made the selection, the next step is to get a price quote from the Branch. The Service Training Manager is usually the one who will do this for you. The quote will be good for 60 days. If the price is within your budget and the components fit your training needs, submit a Purchase Order to the Branch.

What about funding? This always seems to be the major problem for most any school. A long range curriculum plan and estimated budget is a must. Good planning shows that you are serious about your program. A good long range plan shows that you know where you are going and how you propose to get there. It will give you credibility with those who hold the purse strings.

You must be able to sell others on the fact that your program needs funding for a given item. If you expect to be successful, you must first of all be sold on the program yourself. In general I have found that others view a technical training program pretty much the way the instructor does. If the instructor is convinced that he has the best training around that is usually what others will think of the program. Your students will usually perform in the way that you expect them to.

If you have done your homework well, special requests to your local school board or to the State Department of Education will often bring good results. Advisory Committee recommendations can and should be influential in getting funds appropriated. I am aware of several examples where funds could have been obtained for the up-dating of a training program. Someone just did not bother to pursue it enough to make it happen.

Explore the possibilities of some creative financing. This is being done in industry - why not do it in education? For example: Are there any grants available? Sometimes local dealers are willing to donate some components or some complete machines to aid your program. Develop a good working relationship with your local dealers. Some of them may loan you a machine for a specific training purpose. Occasionally the farm equipment companies will donate some given items from a special program. A good example is the four-wheel drive tractor engine that many of you have been given as a result of a special engine replacement program that John Deere currently is involved in.

Maybe two or more schools could share the use of some of the more expensive items. Get acquainted with the Branch Service Training Manager. He may be able to loan you some items for a short period of time. I am sure that if you use your imagination you could come up with other ideas of ways to help up-date your training laboratories. I have covered just a few of the highlights about the program that John Deere has to help you keep your technical training programs up-to-date.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

AVAILABILITY OF HANDS-ON TRAINING COMPONENTS

Larry G. Munton

Reaction to remarks made by Phil Lane

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Industry has been excellent in assisting education with the donation of hands-on training equipment. Those of us who can afford purchases are grateful for discount purchases, however; there are too few who can take advantage of these programs because of financial constraints. One possible solution to this problem would be the reinstatement of the double depreciation program that allows industry to be able to donate equipment to industry without undue strain on the financial resources of industry or education.

Packaging donations of programs will make training hardware more valuable. The package should include:

1) The hardware
2) Educational software
3) Field of factory training for those not familiar with the equipment

Finally, industry should prioritize contributions and effectively manage contributions to assure effective utilization.

With these brief statements I would like to kiss and make up and make sure this marriage of industry and education continues.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

Availability of Teaching Aids (Software)

John Spuller

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Your schools may have obtained many John Deere components for your programs, but what are you doing with them? We're pretty sure that your schools don't purchase or get these components just to sit on a shelf. Obviously, you want to put them to use - effective use - in training AG equipment technicians.

But we all know a component will not disassemble itself to show your students its interworkings. Nor will it explain how it functions or operates, or the typical problems it may have in the field. Likewise, it won't tell your students how to diagnose or correct those problems, or the proper repair procedures.

So where do your students go for this type of information? There are a number of sources, many are available from John Deere - and some of these cover more than just John Deere equipment and components.

These sources include:

- instructors
- books or printed matter, and
- audiovisual materials

Each of these sources has its place, and no one of them, by itself, will do the complete job.

Instructors of course have to be trained. Larry Hodel's presentation discussed some techniques for this. But those opportunities are not available for everyone - nor for all subjects. Therefore, instructors have to rely upon the other sources, just like their students, the available books and audiovisual materials.

John Deere printed materials can be divided into two types - those that are specific for our equipment and components, and those that are non-specific, but deal with the systems or equipment generically.

In the first type, we have our operator's manuals, technical manuals, and parts information. These are the same items that each of our dealers and their technicians have when servicing John Deere equipment.

Operator's manuals, as the name implies, are for the operator of the equipment. They are furnished with any new piece of equipment when it is purchased or leased. These manuals describe operating instructions and adjustments, as well as service procedures that the owner is expected to perform. But, this information is essential for the technician to know when servicing that equipment. John Deere considers this factor so important that we send each dealer a distinctively marked copy of each operator's manual for use as a reference in the shop. Likewise, your schools should have operator's manuals available to your students for all equipment that you use in your program.

Technical manuals are published for most of our equipment. Some of you may call this type of publication a "shop manual." But they are more than that. In these technical manuals are all of the repair and diagnostic information that relates to a specific machine model. Our technical manuals are divided into sections separated by tabs. Each section is for a different system on the machine. Many technical manuals have green tab sections which describe proper repair procedures, and yellow tab sections which explain how the system or component functions and how to test or diagnose problems. Obviously, this information is vital for a technician. In fact, we refer to our technical manuals as the technician's Bible. All of the training we conduct for our field service staff and dealer technicians is built around the technical manual. And we believe your school's training should use this same technique, especially when using John Deere components or machines.

Our parts information is available in two forms - printed catalogs and microfiche cards. Both contain identical information. They are just in different forms for the convenience of the user, ease of updating, etc. Obviously, these items are for John Deere equipment only. And primarily

for our dealers' use in ordering repair parts. However, technicians become involved with parts information when specifying which parts are needed to repair the machines they are working on. Their familiarity with how to find the needed parts information is important. In addition, the illustrations in the parts catalogs sometimes help the technicians see the interrelationship of parts. Especially for those machines which do not have technical manuals.

All of these publications are available for customers and your schools. A catalog, which is available at no charge, specifies which particular operator's manual, technical manual, and parts catalog are required for each machine. These publications can be purchased for a reasonable charge.

In addition to the printed matter that is specific for John Deere equipment, we also have available information which gives generic coverage of equipment, their systems, and other related topics. There are five different series of these books available. I'll describe four of these series of books.

The Fundamentals of Service series, known by many as FOS, and our new series, Compact Equipment Fundamentals of Service, discuss equipment systems and related subjects.

The original FOS series covers systems on agricultural and industrial equipment. There are 15 books in this series. We refer to engines, power trains, hydraulics, and electrical systems as the four basic systems. Eleven (11) other related books cover the subjects of: air conditioning, shop tools, welding, identification of parts failures, bearings and seals, belts and chains, tires and tracks, mowing and spraying equipment, fuels, lubricants and coolants, fiberglass/plastics and fasteners.

The Compact Equipment FOS series has four texts and is brand new. These four books cover the basic systems of engines, power trains, hydraulics and electrical systems, as found on tractors up to 50 horsepower, lawn and garden tractors, riding and walk-behind mowers, chain saws, skid-steer loaders, etc.

Both series of FOS books have associated teaching aids. Slide sets are available for <u>all</u> 19 books. The basic four FOS have transparency masters. Student's workbooks and instructor's guides have been developed for the Compact Equipment FOS.

Fundamentals of Machine Operation, we call them FMO's, are a third series of our didactic publications. These books, as the name implies, cover machine operation, but generically. They use many colored illustrations to describe various types of equipment, not only John Deere, but our competitors as well. They describe how that equipment functions, and the types of adjustments and maintenance procedures required to keep the equipment operating at peak efficiency.

Nine books cover major equipment categories and related subjects: tractors, tillage equipment, combine harvesting, planting equipment, crop chemicals, hay and forage harvesting, preventive maintenance, machinery management, and agricultural machinery safety.

In addition, related teaching aids are available. A slide set and instructor's kit can be ordered for each of these texts.

The Machinery Maintenance book is a recent publication, available since early 1982. It is written to an audience that has little exposure to technology and an insufficient understanding of machinery. The language used is simple, with lots of basic, simple examples to explain concepts in such a way that lets young people grasp the basics of maintenance.

We feel it will easily fit into high school curricula, and can be used by people who speak English as a second language.

In addition to the text, a slide set and teacher's guide are available.

This book was written with easy translation to other languages in mind. It, like all of our FOS and FMO books, is available in Spanish. French language and other language editions of many of these books are also available.

We are proud of the quality of these publications, and feel that they will add meaningful content to your AG mechanic curricula, at all levels. We know many of your schools use these materials, and we thank you for your vote of confidence. We feel that, especially the FOS books, can add to other curricula as well, such as auto or diesel mechanics.

A catalog and price list for ordering any of these publications are available.

That's a brief look at the printed materials available from John Deere, but what about audio-visual materials? John Deere can help you out here also. Besides the slide sets I've mentioned, we also have films, videotapes and sound/slide programs on selected subjects.

Most of the subjects that are related to service and service training are in the sound/slide format. We began distributing these sound/slide programs to our dealers in November 1980 under the registered name of "Pathfinder." The sound/slide format was chosen due to the procedural nature of service training subjects.

These programs are designed to supplement our technical manuals, and are used by dealers in their own in-dealership training programs. They consist of slides in a slide carousel and a synchronized audiotape.

During the past two years, we have developed and distributed over 60 programs to our dealers. They have covered a variety of topics:

- overview of new systems or components
- theory of operation programs
- repair procedures
- diagnostic information
- machine set-up and field adjustments
- or a combination of these

Again, all supplement the technical manual or other printed publications.

We also have some films and videotapes on service subjects that are available for purchase. They include the "....That Engines May Live" - Preventive Maintenance series. Four 16 mm color films or 3/4" videotapes which describe the importance of clean air, fuel, lubricants and efficient cooling for prolonged engine life.

Other service training materials which your schools may want to consider are the service training courses. We call them STC's. These STC's are developed by our factories for new machines, components or systems, or new service procedures. The factories then use these materials to train our branch, field service personnel. And our branches use the same information to train dealer technicians.

Generally, a new machine has a series of service training courses covering the major systems of engines, power trains, electrical and hydraulic systems. Just like our Pathfinder programs, reference is frequently made to the appropriate technical manual.

The STC consists of a slide set and instructor's guide. The guide is not a script, but rather has instructions or notes to the instructor to make the class effective.

A service training materials catalog lists all of our current service training courses and Pathfinder programs that are available.

In addition to these catalogs that I've mentioned for service publications, FOS/FMO materials and other training materials, other items are available at no charge. These include a brochure about our educational component program, that Phil talked about, and two pamphlets that we have developed promoting career opportunities in John Deere dealerships and in the AG machinery service field. Reasonable quantity copies of any of these catalogs or career pamphlets are available upon request.

Aids are vitally important for training whether training dealership technicians or someone who wants to become a dealer technician. I think you can see that John Deere has many aids that can help you in your classrooms. If you can see other areas where we can help, let us know. And after all - that's what this conference is all about.

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

Further Involvement of Industry

Dan L. Schwitters

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The area of Industry Involvement in Ag Mechanization Education that I shall address myself in this brief period this morning will be from the dealer level of commitment in our great industry. We are commited first to our suppliers. It is our responsibility to them to properly assemble, run-in and deliver the products of their manufacture to the end-users, our customers, in the best possible running condition to maximize each machine's productivity, with a minimum of downtime, during its long life. Secondly, we have a commitment to our customer -- That Very Important Person who pays all of our salaries -- to keep those machines operating at top efficiency levels in every conceivable type of field conditions and to the ultimate end that his farming operation will be successful and profitable. And thirdly, we have a commitment to ourselves, as dealers, as individual owner-operator entrepreneurs, to have an adequate place of business backed by a good organization. The demands of these commitments cannot possibly be met without properly educated, highly trained and skillful mechanical technicians on our staff.

The challenge to all of us here today, through a joint effort, brings us together as "Partners in Ag Mechanization." Surely all of us will be the beneficiaries of such a mutual involvement.

To assist in accomplishing the type of partnership that each of us might envision in his own way, may I suggest that it is imperative that a dealership establish a line of communication. This communication should include local secondary agriculture instructors, FFA, 4-H club leaders, other organized farm groups in the dealer's community, as well as the post-secondary school instructors, particularly at those institutions that have an Ag Mechanization program in place and also those that should be encouraged to start such a program. This line of communication should produce clearly defined mutual objectives and goals as well as a discussion of problem areas along with possible involvement and solution. By working closely together, the instructors, the group leaders and the dealer will have a better understanding of each others area of responsibility and how each person can help the others.

In my opinion, the dealer himself, or qualified service personnel, could and should become involved in local and community college political activities. Certainly the head of an agricultural department of any school would appreciate the support of a knowledgeable agri-business leader on the Board of Education, or a concerned tax-paying citizen who understands agriculture to serve on advisory committees. The dealer and his service personnel should assist in organizing and actively participating in various types of local, state and national agricultural organizations.

It is highly desirable for a dealership to invite local secondary and post-secondary school instructors and their Ag Mech classes to special seasonal service seminars at the dealership. Those that have been well attended and well received for us have been tractor preventative maintenance schools, corn planter service schools, and combine service schools. Another very highly beneficial program for us has been sponsoring of ag class groups on tour to the John Deere factories. In this high technology period, the new Waterloo Tractor factory is particularly interesting because it is largely controlled by computers. The factories are staffed with competent guides that adjust their presentation to the tour group. If any of you are within reasonable driving distance of these factories, I would urge you to check out these tours for your groups.

Another area of involvement that would be helpful would be for dealerships to volunteer their technicians to reach and share with Ag Mech groups their latest factory audiovisuals and manuals where new technology and design are used. This type of session could be done by the technician alone, or much better, as planned interaction between the instructor and the technician, either at the dealership or in the classroom. In this connection, because of the ever-increasing accelerating volume of information received at the dealership, dealers should be encouraged to train an in-house special product support instructor that could interpret and

teach the most pertinent information and service procedures that are contained in the Fundamentals of Service Manuals, service bulletins, and the like.

In addition to the hands-on-training components which we have already heard about, dealers should be encouraged to furnish new and used equipment to Ag Mech classes for laboratory use. Not only should these machines be available for set-up or repairs, but also for field use and adjustment under various operating conditions.

It would be well for a dealer, or a group of dealers, to sponsor scholarship awards to prospective Ag Mech students who need help and encouragement and recognize and award technicians for service excellence and accomplishment. In general, through service meetings and conferences, encourage interest and rapport in Ag Mechanization between industry and education.

Perhaps most of you have heard the old adage that is often used by those who are involved in sales motivation, which is this -- "Nothing really happens until something is sold." Usually this adage is associated with the sales department in a dealership. But I'd like to suggest that the ideal situation is a sales-motivated service department and a service-oriented sales department. To sustain a successful dealer operation, the two cannot be separated. One thing for sure -- selling service has been a very necessary ingredient for survival in recent times.

As a potential employer of the graduates of Ag Mech school programs, it is only natural, and perhaps a bit selfish on the part of dealers, to want to hire people with the very highest levels of competency skills. We know we cannot expect to get graduates with a B.S., a Masters or a Doctorate degree level of knowledge and skills from a two-year Ag Mech program, but we should expect graduates to have a thorough understanding and working knowledge of the basics of the machines normally used in this midwest area.

Most of the students just out of high school and in their first two years of post-secondary education are still under the protective care of over-loving parents who have given them their every need and desire. The very fact that you instructors have tolerated them through this period of just growing up is an accomplishment of no small magnitude, let alone, teaching them everything in the curriculum. But there is one basic character element that is all too often very sadly lacking on the part of the graduate. And that is an understanding of what the business world out there is all about. Some of them take the "Free Enterprise System" literally -- that is FREE. Sure, they know as far as their own personal finances are concerned there has to be as much income as there is outgo, but they have extreme difficulty relating to the fact that the hourly wage they receive is only about a third of the costs incurred in providing employment for them. They want to be paid for every moment they are on their employer's premises, but they do not always have the urgency to produce income for that same period of time. Some graduates seem to have the illusion that with diploma in hand, they should start on top. Somehow they do not realize they have acquired only the basics upon which to build a successful and rewarding career.

No doubt there are many causes for the dilemma we find ourselves in these days. The changes in our society, though gradual, have been drastic, particularly the work ethic, at least since I was first employed at a John Deere dealership in 1935. In spite of the fact that my regular work week was 70 hours, and my week's pay was only $12, I was really glad to have a job -- and I was actually being paid while I was learning. I soon learned too that those who produced kept their jobs. Now, there are different attitudes in the work place. With the influences of teacher unions and the lack of urgency to get things accomplished, there is little wonder the student has difficulty in adjusting to the competition he finds in the real world.

In conclusion, may I say that the best part of this conference has been the process of self diagnostic soul-searching that has been a part of the preparation for coming here. Everyone has a responsibility, everyone must contribute, and everyone will gain by participating.

Keynoter, Larry Statler, we want you to know that we have been a part of the problem long enough -- now we are going to be a part of the solution.

FURTHER INVOLVEMENT OF INDUSTRY

HOW AN INDUSTRY REPRESENTATIVE CAN ASSIST YOUR EDUCATIONAL INSTITUTION'S AGRICULTURAL MECHANIZATION DEPARTMENT

Reed G. McCulloh

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I would like to take the next few minutes to visit with you about the ways in which someone like myself can assist your institution in providing the level of education necessary for those students seeking a career in the agricultural implement industry. My viewpoint is based on my experiences as a graduate of Iowa State with a Bachelor's degree in Ag Mechanization, an employee of a John Deere dealership, an Area Service Manager, and a member of the Farm Equipment Mechanics Advisory Committee at Kirkwood Community College, Cedar Rapids, Iowa.

It is especially important to me that we do a topnotch job of educating those people who will be technicians in our dealerships, since it is through them that we will better able to serve our customers.

In order to achieve this goal, industry and your institution must work together. Communication is essential in order to understand each other's needs, expectations, and future plans. A conference such as this is a tremendous starting point, but we must continue the communication once we are back home. It is this follow-up at home that I will address.

The local liaison between industry and your institution will undoubtedly be your Area Service Manager. As Larry Hodel mentioned earlier, each of you should be acquainted with your respective Area Service Manager. Once this contact is made, the next step is orientation of both parties with current and future plans as far as curriculum, teaching aids, and teaching facilities is concerned. The Area Service Manager should be able to give some insight to areas which may need more emphasis or assist in implementation of new concepts.

In working with dealership technicians, I feel that we need to continually stress the importance of basics in all machines, systems such as engines, power trains, electrical, and hydraulics which may be found on any machine. I quite frequently assist a technician who has "lost the forest for the trees" by making a problem more difficult than it really is. This occurs because he does not understand the basic concepts of the system for a machine. For example, in working with a hydraulic system, a technician must understand that there will always be a pressure drop across an orifice as long as flow occurs. To overlook this basic concept, he may not be able to diagnose a hydraulics problem as expected. As another example, I have frequently encountered technicians who experience difficulty understanding electrical systems. A wire carrying battery voltage will not operate that function if the function is not properly grounded. Remember, we are no longer simply educating mechanics, rather we are developing technicians; those who can properly diagnose and then repair machines.

Also, in meeting with instructors and administrators I have indicated the importance of keeping instructors current on new concepts and technology. This becomes extremely important in teaching practical applications of the basic concepts to advanced classes.

In meeting with students the Area Service Manager could also be of assistance by providing information about the job world. He may be able to review job possibilities as well as ideas about getting the proper background for a particular job. As an example, we are constantly in need of those who can handle the position of dealership service coordinator. This position would involve one with scheduling, shop tickets, warranty claims, and filing service publications. Another point to be made to the students would be that even though they are being developed primarily for service, they too are salesmen; salesmen for themselves, their dealership, and the company their dealership represents. Today it is important to have a service oriented sales department as well as a sales oriented service department.

The Area Service Manager could also assist with the technical training of the students. This I have done at Kirkwood by helping the instructors on subjects such as planting equipment or harvesting equipment during a regular classroom or laboratory session. I have covered aspects of these subjects such as theory of operation, predelivery and initial adjustment, troubleshooting and diagnostics, as well as field adjustment and operation of these machines.

Another valuable contribution an Area Service Manager can make is to assist in obtaining teaching aids for hands-on work. Occasionally I find a failed component which is not suitable for

repair, but which is still very useful for lab work. With the cooperation of some of my dealers, I have been able to donate several items such as hydraulic pumps, hydraulic motors, valves, and other similar components and assemblies to Kirkwood.

As Dan Schwitters just mentioned, dealers can assist schools in several ways. I have encouraged my dealers to cooperate with schools as much as possible whenever they are contacted. The dealer may assist by loaning a new machine to the set-up and predelivery class, or a used implement to reconditioning class. I usually assist dealers with several customer clinics each year which cover subjects such as planters, combines, and tractors. Although dealers have these for their customers, instructors and students are always welcome.

Through co-op programs, dealerships, institutions, and students can achieve a better understanding of each other's needs. I have encouraged some of my dealers to consider this, and I encourage you to consider this alternative also.

A key part of any school is its advisory committee. At Kirkwood this committee is made up of industry representatives, local dealers, former students, and other members of the community who have an interest in the agricultural curriculum, as well as instructors and department heads. Serving on this committee has been a very beneficial experience for me, and I hope for the school as well. I encourage you to ask the assistance of local dealers and industry representatives to serve on such a board or committee.

In closing, I hope that I have given you some new ideas and resources which will be useful to you.

INDUSTRY'S ROLE IN AGRICULTURAL MECHANIZATION EDUCATION

"FURTHER INVOLVEMENT BY INDUSTRY"

GARY K. HENDRICKSON

Gary K. Hendrickson
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Industry involvement in agricultural mechanization education is a very important segment of our future. Dan Schwitters discussed a dealers commitment and Reed McCulloh followed up with a review of an area service manager's commitment to mechanization education in our industry.

I would like to now discuss John Deere's commitment to ag mechanization education as I see it as a service manager in a John Deere Sales Branch.

First of all, I would like to say that our role from the Sales Branch is primarily a supportive role for our dealer organization and area service managers.

Our dealers and area service managers are closer to the needs of our dealers and also closer to the educators on a local level.

Dan earlier discussed a dealer's need for qualified people in a dealership and I certainly understand and agree with his needs. We are supportive of our dealers' needs and treat them with a true sense of urgency.

There is another need in our industry and that need might be considered an internal company need. Our need is to recruit and train qualified individuals to provide our company with future area service managers, territory managers, department managers and so on, so we can provide our dealer organization with quality technical, managerial and sales assistance.

The challenges that Dan, Reed, and I have discussed and your challenges as educators have brought us together as "Partners in Ag Mechanization." It is my true feeling that this mutual involvement will be beneficial to all of us in the present and future.

Dan and Reed have discussed involvement in agricultural mechanization education from a local level and so I will discuss items pertaining to our involvement in a sales branch area which includes several states.

We encourage our area service managers, territory managers, division service managers as well as myself to serve on advisory boards and committees in state and national organizations. We can provide guidance to these organizations so they have an insight to our industry's needs. I have in the past years been involved on two advisory committees in Ag Engineering departments in universities. Our Company certainly encourages this type of involvement and we want to be of assistance to our educators.

In our Branch we have a continuing service training program for dealer service technicians. In these service training centers we schedule classes almost on a continuing basis. We certainly want to encourage and welcome an opportunity to have educators attend our classes so that they might stay abreast of the industry's educational needs. In my past I have had an opportunity to be deeply involved with several universities and technical schools in our sales branch area that did participate in our service training sessions each year. They found it extremely beneficial.

We have in our service training centers, instructors that would certainly enjoy participating in educational programs or classes at your schools or colleges. These people are extremely busy but with adequate forewarning, we would appreciate an opportunity to be involved in part of an educational program. We feel this would add a new dimension to us as partners in agricultural mechanization.

In our service training centers we have numerous components, training aids, slides, cutaways and so on that could be loaned to schools during our off seasons or when these items are not in use. There are also times when we have damaged items that may not be usable in a machine, but would make excellent training aids that could be donated to your efforts.

Our Company has been very active in sponsoring scholarships and donations to schools to encourage interest in agricultural mechanization. I have, in past years, presented donations to promote agricultural mechanization education in different schools and colleges.

We feel it is extremely important to encourage a working rapport between our industry and you people as educators through conferences as you are attending this week. We would also encourage our people and dealers to sponsor conferences at a more local level.

I sincerely believe that we can be "Partners In Agricultural Mechanization". We certainly need you and we want to be of assistance. I am looking forward to future involvement in agricultural mechanization education so if I can be of further assistance, please contact me or come to Kansas City for a visit.

INDUSTRY'S ROLE IN AG. MECHANIZATION EDUCATION

AVAILABILITY OF TEACHING AIDS (SOFTWARE) AND FURTHER INVOLVEMENT OF INDUSTRY

DALE PARKER

REACTION TO REMARKS MADE BY: JOHN SPULLER, DAN SCHWITTERS, REED McCULLOH, AND GARY HENDRICKSON

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Reaction to: Availability of Teaching Aids

1. John Deere does a great job of producing softwares useful in the classrooms.
2. They are also used in Automotive, Diesel and Parts Programs on our campus.
3. I would encourage dealers and company personnel to remember the local schools when parts books, microfiche, service manuals or any other type of instruction manuals become outdated or revised. These can be used by local schools and should not be thrown away.

Reaction to: Further Involvement of Industry

1. We need dealer and company communication.
2. We need local service seminars.
3. We need scholarship and accomplishment awards.
4. We need dealer administrators to visit and talk with prospective mechanic students about the reality of the business world.
5. We need job opportunities information from dealers and company reps.
6. We use advisory committees.
7. We use your Waterloo factory tours.
8. We use your branch service schools.
9. We use your hardware that we receive from John Deere in our programs.

I thank John Deere for what they have done for my class program and my community college.

I anticipate that this conference will motivate and build enthusiasm for instructors, students, dealers, company personnel and start to accomplish fulfilling the needs gap between industry and education.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

(Session Chairman — Tom Hoerner)

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TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

The Quality Ag Mechanics Instructor

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"A bucket of sand at the seashore isn't worth much, but mix it with cement and water and it has commercial value. Untrained minds and hands are a drug on the market--like a bucket of sand at the beach. But mix them with knowledge and discipline, and the world goes bidding for them."

Henry Basch, Jr.

Interest

Okay you guys let's get to work. You all have your projects so let's get started. Any questions:

George Shorter: We're out of acetylene, I need it today--Oh, that's right, the truck comes tomorrow. You help Forrest Bear today. Sorry about that.

Larry Statler: I wasn't able to get my parts last night. I don't have anything to do. Work on your plans and share them with me later.

Gary McVey: Where is the torque wrench? Gosh, I loaned it to the industrial teacher. Didn't he bring that back yet? Go get it, will you Gary?

Okay, let's get at it.

I'm afraid that too many times this is the case in our agricultural mechanics teaching. It's get to work with little or no group or possibly individual instruction. The equipment and supplies aren't available or in working order. You say, yes, that's true in our high-school programs, but not at the post secondary or university levels. Are you sure--I hope not.

Today, I see my position as one of motivating you and setting the stage for the remainder of the conference so I want to visit with you about the major criteria of the Quality Ag Mechanics Instructor (the subject given to me and I feel it is of vital importance). Webster says: "Criteria are standards for judging," so my objective is upon completion of this presentation members of this audience will be cognizant of the major criteria necessary to be a quality Ag Mechanics Instructor.

Three major areas of which the instructor should be concerned as an Agricultural Mechanics Instructor are his Personal input in teaching, the Program he develops and delivers and thirdly, the proper use of the Physical facilities and equipment. I shall try to subdivide each of the three Indicators of Success into two subtopics in order to illustrate and explain my points of view. Let's just begin with the Personal aspects.

Personal

1. Competence - How can one teach a subject if they do not know the material to be taught. In Agricultural Mechanics, how can the instructor set the example without being able to perform the skills himself. I'm fearful that too many times our Ag Mechanics instructors are generalists; they have not had the indepth training in their educational program. At the most, they may have taken four or five courses in the subject matter field of Agricultural Mechanics. I'm not knocking being a generalist because I'm one myself, and I think it's good in some positions, yet in most cases it means additional education beyond the B.S. level. In this day with rapid advancement in technology, it's difficult to keep up even if one has had a good basic education.

2. Method - Just because Agricultural Mechanics is a laboratory course and there is opportunity for hands-on experience, it in no way means that the instruction shall be work on projects and doing skills alone. The effective instructor uses a variety of teaching techniques (demonstrations, field trips, resource persons, lectures, appropriate audio visuals and group discussions) injected with enthusiasm, organization and proper delivery procedures. I especially like the use of skill sheets which provide a blueprint for learning by the individual student. I need not talk about skill sheets because many of you in this room are users and developers, yes, even merchants of skill sheets. If there is one area in which the Building Block Method of Teaching is important, it's in the field of Agricultural Mechanics. The student must use tomorrow. Let's help students learn to make decisions in choosing equipment, selection of materials and design of projects.

The next major criterion is how well the instructor develops and manages the Program.

1. Current - Teaching in Agricultural

Mechanics can be outdated rapidly. Even though some of those basic skills and knowledge are taught through the use of projects, shouldn't we try to use projects and machines that are relevant for today's agriculture. At the risk of insulting some of you, but surely not meaning to, I ask is working on old outdated engines a relevant project just because it teaches the student some engine operation, maintenance and repair. Agricultural Mechanics is a vast subject with so many related areas of instruction. The good instructor will assess the needs of his graduating students and place the emphasis on those subjects in which the content learned will be of most value as the student enters the world of work. The time has come when some things have to be deleted and others added in order to keep current with the curriculum in Agricultural Mechanics--What is it, what should it be?--You are the specialists. Maybe that's a point of discussion for this conference.

2. Relevant - We've already alluded to relevancy but let's look at another dimension. Four teacher educators in Agricultural Mechanics, two of which are in this room (Tom Hoerner and Forrest Bear) made a presentation via video tape at the Southern Regional Ag Ed Conference in which they addressed the topic of Directions in Agricultural Mechanics for the Eighties. They discussed issues, time allocation, teacher competencies, safety, skill development, relationship to SOE programs and the influence of contests. The Agricultural Mechanics teacher who wants to check on whether or not his program is relevant would do well by viewing this tape or reading the summary in The Visitor published by the Division of Agricultural Education at the University of Minnesota.

John Deere would not sponsor this conference if they did not have an interest in the Ag Mechanics program of your state in being relevant and related to the needs of their personnel, some of whom are your graduates. How long has it been since we've consulted with Agricultural Mechanics Industries to determine if our graduates are being educated to meet their needs? The smart instructor conducts a relevant program.

In all probability the major criteria in which the Agricultural Mechanics instructor is judged most is by the way he maintains the physical environment for his teaching.

Physical

1. Organization - I believe there is a positive relationship between how well the Agricultural Mechanics laboratories are maintained and the quality of work done by students. Students may not learn more but they surely like it better when there is good housekeeping. Surely, administrators are very concerned about the organization and maintenance of equipment and supplies. It requires good management skills, yes, even leadership on the part of the instructor to organize and maintain a laboratory which is up-to-date, neat appearing and a good learning environment. With economic conditions as they are, instructors cannot expect to add or replace equipment too frequently, therefore, good maintenance is a must.

2. Safety - It almost goes without saying that safety in the Agricultural Mechanics program is of vital importance. The competent instructor teaches safety, practices safety and provides a safe working environment for the students.

RECRUITING AND PROVIDING QUALITY POSTSECONDARY INSTRUCTORS

Educational Requirements for Instructors in Ag Mechanics Programs

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INTRODUCTION

As the Director of Agricultural Education in Missouri, I have the responsibility of overseeing and developing the portion of the Missouri State Plan for Vocational Education which deals with agricultural education in the state. A part of that responsibility deals with the minimum certification requirements for all instructors involved in reimbursed programs. I know that my counterparts in other states have similar responsibilities in developing these state plan requirements. Making these decisions involved an indepth consideration of instructional program goals and/or objectives at the local level in terms of student outcomes and the processes used for achievement of the goals.

For the purpose of this discussion, I am assuming that the local instructional program goal is to provide educational experiences for students which will enable them to acquire and maintain suitable employment in agricultural mechanics. I am further assuming that the required competencies needed by the students have been identified and validated through the utilization of industrial personnel, and that the program is going to be conducted in a postsecondary institution. My purpose today then is to offer some suggestions as to the educational requirements of the instructors responsible for conducting an effective postsecondary agricultural mechanics program and how they should be determined.

In approaching the challenge of making this determination, I would suggest that we make use of an occupational analysis approach. This approach is not new to vocational educators. Simply stated, it is a process of describing an occupation and identifying needed competencies for a person to be successful in the described occupation. As I reviewed the literature for this presentation, I found studies that had been conducted which identified the competencies needed by teachers involved in agricultural mechanics programming. I am sure these studies are available for the use of educational planners. The end result of this is that the identified competencies provides us a basis for making a determination of the educational requirements for the occupation in questions, specifically, instructors of agricultural mechanics.

For the sake of this discussion, let us briefly analyze the job of a postsecondary teacher in charge of conducting an effective program of ag mechanics. Assume the program goals and/or objective state that upon completion, students would (1) possess mechanical skills which are marketable to industry and (2) possess leadership/personal skills necessary for job success. What competencies are needed by a teacher to conduct and manage the various educational processes to achieve those goals? Two categories of competencies and/or skills come to mind: (1) Educational Programming Skills; and (2) Technical Skills.

Educational Programming Skills - Educational programming skills can be subdivided into (a) program management activities and (b) teaching/learning activities. Program management activities include such things as (a) the development of curriculum materials; (b) managing facilities and equipment; (c) working with outside groups such as advisory committees, employers, etc.; and (d) being able to function in a public institutional setting.

Teaching/Learning Activities might include (a) understanding and using various teaching methods; (b) understanding students motivation and learning; (c) working with students in classroom/laboratory settings; and (d) working with students in non-classroom/laboratory settings such as student organizations, internships, etc.

Technical Skills - A teacher must possess a knowledge of and be able to perform the tasks he or she plans to teach the students. This knowledge or technical competence must be based on the identified and validated competencies of the occupations for which the program is meant to prepare students.

Perhaps I can aid the understanding of this analysis with the aid of a visual. If we could plot the amount of educational programming skills on the "Y" axis and the technical expertise on the "X" axis, we could illustrate the levels of needed competencies. (See Exhibit No. 1)

When considering the supply of persons for staffing the programs, we generally find two categories of persons. Category one might

include those persons who have adequate educational program skills but low technical skills. Category two would be those persons with low skills in educational programming and high technical skills. It is obvious that these two categories of people have different educational requirements for job success in the field of agricultural mechanics instruction. The educational requirements should provide for a means to remove the deficiences of individuals so that they could achieve the desired level of expertise.

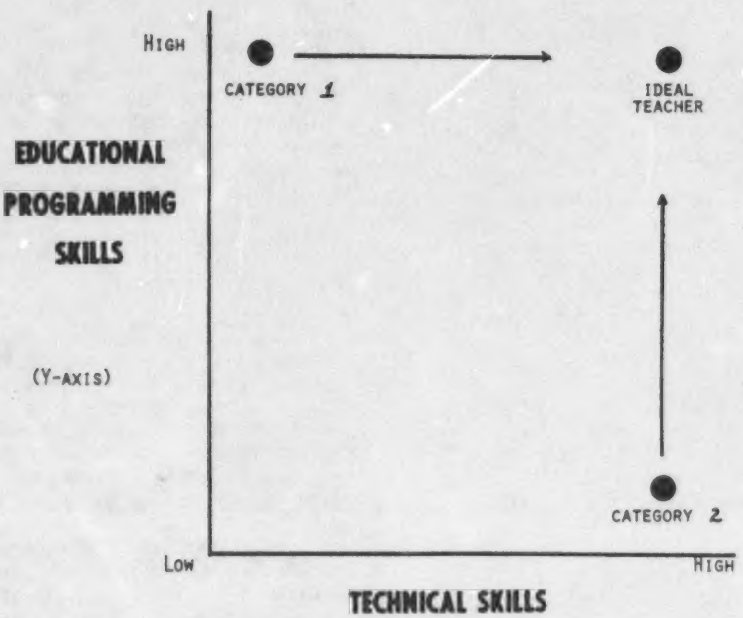
Specific educational requirements for those people who have limited technical expertise, should include internships in industry, industry training schools, advanced college mechanics classes and/or advanced workshops which are based upon competencies determined by business and industry. The persons who have high technical skills and limited teaching expertise need courses structured toward the curriculum development and construction, program development and management, and methods of teaching.

Once the teacher has met the required level of expertise, updating is always a continuing need. Inservice education is always required for all teachers. Experiences and the updating of professional techniques as well as the technical update are important. Updating requirements might include internship or short-term summer employment in industry; updating seminars; college credit courses; and industrial courses. In order to keep the teaching profession current, these educational requirements could be, and in most cases are, incorporated into a scheme of temporary certification of the teachers so that the teacher must remain up-to-date to maintain a teaching certificate.

In conclusion, I have tried to present a rationale for needed educational requirements of postsecondary agricultural mechanics teachers. Briefly, this discussion included an analysis of the student training program and the teaching requirements for the program success in terms of student outcomes. I have not suggested specific times and course titles. I feel this information must be gathered through joint efforts of teacher educators, supervisors, and industrial representatives. I am suggesting that we must continue activities such as this to aid in solving problems of continuing to provide this country with the most efficient agricultural industry the world has ever known.

EXHIBIT NO. 1

SKILLS OF POSTSECONDARY TEACHERS



TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

EDUCATIONAL REQUIREMENTS FOR INSTRUCTORS IN AG MECHANICS PROGRAMS

Gordon G. Jindra

REACTION TO REMARKS MADE BY LARRY CASE

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Analyzing Educational Requirements

I feel the approach of occupational analysis for educational requirements is very important, as we will find a wide variety of jobs, training programs, and objectives of these training programs. The better the job analysis, the more each respective training program should equip students and graduates with necessary technical and related skills and knowledges to enter the world of work.

Teacher Role on the Job

I feel the main role of the Agri-Business Mechanics instructor is to teach students. He must be not only knowledgable in the areas of instruction, but must be able to relate to individuals on their level of understanding, which may really vary in a given class. Thus, I strongly agree with the use of various teaching methods to fulfill the role. Other responsibilities of a good instructor include counseling students if they need extra help, or are encountering problems affecting their educational performance. Along with that assistance with student placement for interim job experience or final placement, puts the instructor in touch with the changing needs of industry and the success of his students in meeting those needs.

I do agree with the need of instructor ability to work with outside groups, as advisory councils, inside groups as student organizations, and with present economic trends the care and management of equipment and facilities under tightening budgets is equally important.

Technical, Management and Teaching Skills

Technical skills and teaching ability I believe are of equivalent need, one must not only know their area as I mentioned before but be able to deliver the materials to the student. Of equal importance is to stay up to date. I feel that industry and education need to work hand in hand to help educate and update instructional staff. Maybe industry can help by offering more technical instruction under collegiate direction to allow not only for technical expertise but advancement in teaching methods, or audio-visual supplementary material. Providing technical training under collegiate credit helps to advance instructional staff on the monetary level and if we are to hold good people in the Ag Mechanics teaching area we must be competitive on the salary schedules.

I feel we need help from both education and industry in new areas of instruction. An example might be mini-computers. We are all aware of the great advances computers have made for industry. The greater efficiency the computer has offered the parts area, but presently I am not aware of software available for training the farm equipment parts system on the small Apple, Radio Shack or IBM computers which are more affordable to the education system. As I make that comment, I feel I should bite my tongue as I am aware of the multitude of good teaching materials in other areas developed by education and industry.

On-the-job-training is important for the Ag Mechanics instructor initially and for update training. It can be accomplished in a variety of ways: 1) extended leave of absence for retraining, 2) summer jobs where there are shortened contracts, or 3) I like to think you can learn a lot when working with the students and implement dealers or industry during an on the job training program.

Requirements

Minnesota's education requirements for an instructor entering the Ag Mechanics program on the Post Secondary level 13-14 year as an Area Vocational Technical Institute are: a) Related Education degree, 2 years/4000 hrs relevant occupational experience, or c) 2 years Post Secondary education with 3 years or 6000 hrs experience. All followed up by Post Secondary Education Sequence, Human Relations, and Philosophy of Vocational Education. Having these different licensure requirements I think it obvious that the needs of individuals will vary. Thus, again we need the combination in types of technical instruction methods, management, and curriculum development course work for educators.

Updating of staff is very important and I feel we need an open format to follow to allow instructors to enhance themselves both in technique and technical materials. Our guideline in Minnesota requires 108 clock hours of update every 5 years to come from the following:

1. Occupational experience - 1 clock hour for every 4 hours work
2. Credit courses - 12 clock hour/credit
3. Conferences, seminars in business and industry - 1 hour for 1 hour
4. Updating leave - max 60 hours
5. Regional, statewide and national curriculum design activities
6. Voting member of advisory committee
7. State evaluation team - 5 clock hrs/day or 10 clock hours total
8. Organized Research - max 20 clock hours

From that format you can see in the Vocational Education area we recognize many areas for advancing the instructors ability.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Technical competence requirements for instructors

Victor Bekkum

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WANTED:

Technically competent postsecondary instructors in ag mechanization. When recruiting the model postsecondary agricultural mechanics instructor, look for the following qualifications: farm background, technical competence in all areas of ag mechanics resulting from a combination of 20 years of industry experience and an undergraduate education, 22 to 25 years of age, pleasant personality, and good looking. Seriously, we do get a little idealistic sometimes and so we need to temper that with some practicality.

Factors Influencing the
Technical Competencies

Developing Technologies:

The technical competency requirements for instructors have evolved with the developing technologies in mechanized agriculture. More than at any other time, however, I believe there are several additional factors influencing the technical competency requirements. Among them are:

Economic Conditions - as machinery costs more and becomes a larger portion of the farmers' operational costs, the managerial aspects of a mechanized farm become increasingly important. We're talking about: cash flow, return on investment, justification for ownership, ownership and operating costs. Do I need to continue to list?

Energy Resources - as our energy resources dwindle and cost more, we need to be alert to advances in energy technology (old and new). What's in store for the future with regard to energy is a debatable topic. Are we aware of the possibilities in a mechanized agriculture?

Soil Erosion - soil erosion looms as an ever-continuing threat to the capacity to produce our nation's food and fiber needs. It also threatens the farmers capacity to earn a living. A related concern is the availability of quality water. Like the ostrich, we can stick our head in the sand or we can strive through education to help bring about the changes needed. We can wait for the political processes to legislate soil and water conservation (if it can be legislated) or we can take action.

These factors influence the technical competency requirements of our postsecondary ag mechanics instructors. I present to you these thoughts for your consideration. The technical competency areas requiring more emphasis are as follows:

Tractor Power:

The modern tractor must be sold, operated, maintained, repaired and serviced by persons knowledgeable about diesel engines, hydraulics, air conditioning, monitoring systems and the like. Purchasing or leasing a tractor today requires all parties involved to be knowledgeable of sound management principles. A profit in farming operations benefits more than the farmers as we all know.

Technological changes in the future will no doubt include alternate fuels and electronic monitoring and control systems.

Machinery/Management:

The operation, adjustment, maintenance and repair of farm machines continues to be a priority. Again, as with the farm tractor, the managerial aspects have increasingly become more important. Decisions is the name of the game and there are many to be made in machinery management.

Electricity:

Electrical energy in all its forms and origins continues to play major roles in agricultural mechanization. The energy sources to produce electricity may change but the need to use and maintain safe electrical systems remains.

Soil and Water Conservation:

Soil losses are considered as major national concerns. Agricultural mechanics instructors must be knowledgeable of the role of machines in promoting soil erosion. They can play an active part in educating their clientel in the proper use of soil-saving techniques.

Technical competency areas of somewhat less emphasis include: carpentry/construction and metals/welding. Some related competencies that will require more emphasis include: computers, methods of teaching, communications, management, and public relations.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Technical Compentence Requirements For Instructors

James C. Frisby

Reaction to remarks of: Victor Bekkum

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Professor Bekkum listed several technical competence areas as well as related competencies. He suggested that some traditional areas, such as carpentry/construction, should be reexamined for current relevance. Some new areas, such as microcomputer programming and use, seem to be gaining importance. I believe his remarks were appropriate.

The term, agricultural mechanization, does not, I believe, mean the same thing to all of us. Therefore, we will likely not be in agreement on the competency required for instructors. To those from Land-Grant Universities, agricultural mechanization identifies a four-year, Bachelor of Science curriculum administered by the Agricultural Engineering Department in the College of Agriculture. The curriculum includes Agricultural Engineering courses as well as courses in communication, natural science, physical science, humanities and business. Graduates of this curriculum usually take sales or service management jobs in agricultural industry or return home to operate or manage a farm or ranch. The curriculum is not intended to train technicians in specific skills.

In Vocational-Technical or Community Colleges, agricultural mechanization refers to one-year or two-year programs that are intended to train skilled technicians. For teachers in these programs, up-to-date, technical, industrial work experience is very important.

Recruiting & Providing Quality Post Secondary Instructors

Where Should Instructors come from? - Background Experience

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When a discussion develops concerning the background needed by an ag mechanics instructor, the question that eventually arises is one of which is more important - a strong formal education or a strong technical background. It is difficult to make a clear cut decision, as I believe both are important if we are to supply adequate numbers of competent ag mechanics instructors. It should be obvious to all that neither a strictly formal education in the teaching field nor an entirely technical background with no education in the teaching field will produce an immediate well-rounded, top notch ag mechanics instructor. Given time and the necessary in-service training in the respective areas, an instructor from either background can develop into a very competent instructor.

Obviously the ideal would be an individual with a background from both areas, but, I believe, this too rarely is the case. I will speak to what I believe the ideal background for an ag mechanics instructor should be.

Currently most ag mechanics instructors are being recruited from the ranks of secondary agriculture teachers, technicians from industry, or persons with other mechanical backgrounds. The secondary ag instructors for the most part have had an educational background from the traditional ag education curriculum with little formal training in technical ag mechanics. People recruited from industry have much more technical training and experience, but little or no formal training in education. Obviously there are exceptions to these situations, but for the most part I believe this to be more the norm.

For the purposes of this presentation, I am going to take the position supporting the formal education approach for providing the top-notch ag mechanics instructors needed at the post-secondary level. The program that I am proposing is by no means an absolute, but rather what I would consider to be an ideal background and preparation for a young person who plans to become an ag mechanics instructor.

First I believe it would be an asset for an ag mechanics instructor to have been raised on a farm. This not only allows an individual to become familiar with agriculture machinery but also allows for a development of the basic "hows" and "whys" of machine operation that should form a strong foundation from which to develop. Further, this early exposure to farm equipment can form and nuture an early bond to that fascination or love for understanding, operating, and maintaining equipment. This may be that extra experience that makes for the extra special ag mechanics instructor. This early background is not essential, but I feel it can be a very positive influence.

There are many educational options a potential ag mechanics instructor can pursue. The following example will assume that the student will be starting at a community college and then transferring to a university. In the first two years of college, the future ag mechanics instructor could pursue one of two curricula. The first option he could pursue is the college preparatory courses with a liberal sampling of ag mechanics technical courses. This class offering would insure that the student obtains an adequate background in the college preparatory and educational courses as well as a beginning technical-mechanical background that is needed.

At the present time, the technical training aspect in this college preparatory curriculum is rather limited. The student has little opportunity to gain the basic technical expertise that is needed because of the traditional requirements for the college transfer courses that must be met. Perhaps one of the problems of the present system is the hangup on structured college transfer requirements. Even the courses offered as "mechanics courses" need to have emphasis placed on the practical side of the training rather than a heavy emphasis on the theory of the mechanics--that is, "hands on" instruction is very importnat. This, I believe, is a major shortcoming of the present educational system for training ag mechanics instructors.

At the university level the student needs the opportunity to round out his education by supplementing the area that may have been de-emphasized at the community college level. The student that has elected to pursue the college transfer course with a few courses in ag mechanics the first two years needs to have a heavier concentration of technical ag mechanics courses offered at the university level.

An important part of this educational training should be on-the-job experience training sessions or an apprenticeship for a period in the school year or during the summers.

The other option that could be pursued would be the technical ag mechanics curriculum with the intent to transfer to a university. This curriculum would concentrate on the technical experiences of the student who would pick up the education courses at the university. The advantages of this program are that the student would receive a concentration of hands on as well as classroom instruction in ag mechanics at the community college level. This would allow the student to broaden his background in the field of mechanics and perhaps specialize to a limited degree in a specific area of his choosing. For example, a student might begin specializing in diesel systems, air conditioning, transmissions, or other area of his choosing. A possible disadvantage of this system is that the technical training would be limited in the last two years at the university and would put the student somewhat out of contact with the newest of technical advances. At the university level, the student who has completed the ag mechanics option at the community college needs to supplement his education with the preparatory educational courses at the university. However, all of the future ag mechanics instructors should have the opportunity to increase their technical skills while at the university.

A basic question that must be posed when pursuing the educational requirements for an ag education degree is, "How do I become technically competent"? My personal experience was on an individual basis through in-service training schools, factory training schools, and a great deal of reading and self-teaching. This has proven to be a rather time-consuming and unstructured means of gaining technical expertise.

To remain current and/or to continue to develop their skills further, the students and present instructors could use the summer by enrolling in a training session or participating in an on-the-job training or industry training school. This need could best be fulfilled by industry helping to fill a void through in-service or additional training sessions for these individuals. Industry is best prepared to offer the technical up-date training schools as it is keenly aware of changes being made in new equipment and systems related to that equipment. This on-the-job experience training would afford an opportunity to begin the development of the in-depth technical experiences needed by the future and present instructors.

Instructors who are recruited from industry will certainly have the expertise in the technical aspects of the ag mechanics program. A person with a strong technical background can bring a great deal of technical expertise into the classroom. The problem that must be addressed in this situation is one of becoming educationally competent. The technician may feel uncomfortable in his role as an educator. He must be able to communicate his technical knowledge and ideas to the students. The technician must find a means of developing an appropriate educational methodology whether it be through a concentrated formal program or in-service education courses. This problem will be addressed by other members of this conference.

The point that must be remembered is that regardless of the background of the instructor, the ag mechanics instructor is just that--an instructor or educator--not a mechanic.

Recruiting & Providing Quality Post Secondary Instructors

Where Should Instructors come from? - Background Experience

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Where then should instructors come from and from what background experience? I am going to draw upon my own 31 years of experience and observations to react to this topic.

I would like to say at the outset that I am not against a formal degree type education. As a matter of fact I am envious of most people who have degrees. I would also like to suggest that the lack of a formal degree does not necessarily mean that one is not educated. I get quite perturbed when I hear today's technician being stereo-typed as a individual who has not bathed in several days, wears an 18 shirt, a size 2 hat, and drinks paint thinner at his coffee break. Todays technician needs to be a very learned person as I will elaborate on later.

I earned my credentials through 30 plus years out in the real world. I would like to list a few of these experiences. I swung wrenches for around 12 years, served as a service manager for 13 years, worked in sales for a couple years selling everything from insurance to automotive test equipment, I took correspondence courses, I ran my own business for a few years and I believe you should earn a doctorate's degree for that. I have attended well over 200 seminars covering service, repairs and management. I have in the past and will continue in the future to read alot. I have taken some courses through the college and I still learn daily via my teaching and from the students. I guess the biggest problem in getting educated in this manner is that by the time you get it learned you are nearly too darned old to use it.

I believe we should look at who the technical instructor will be teaching, so we can set our goals in that direction. As I see it we will be teaching people who are interested in the repair field. Some will have technical backgrounds others will not. To the point, we will be teaching people to be agricultural mechanics and not necessarily orators, scientists, or engineers. Teaching people how to properly fix the darned thing and bring it back to within factory specifications. We will be doing this because of the lack of really qualified people to do the job. Current industry periodicals tell us that the technology is far outdistancing the ability of today's technician and many dealers verify this fact. There are technicians in industry that can fill the void. There are those that are technically qualified, have good communication skills, are good readers, have good comprehension, can apply their knowledge, are good organizers, have a good attitude, a sense of humor, and a sincere love and concern for the student and his fellow man.

Some other pluses of a good technical person is the fact that he has his finger on the pulse of industry. He can make classes relevant. For instance, I teach a shop management class in which we recently covered a chapter on dealing with the irrate customer. I have been there, I have faced the angry customer with a jack handle in his hand ready to thump me. We discussed firing a worker. I have been there making those gut rendering decisions. I can tell the student the many ways tech math will help and the same is true with technical subjects as well.

The good technician also has learned how to fix it. He has learned how to deal with problems concerning electricity, electronics, hydraulics, refrigeration and the general laws of physics. He knows proper repair procedures, and tool application. He has found out the acetylene torch is not just for brazing or welding. The gas is a very viable part of the trade. He can be the missing link not found in many textbooks and technical manuals.

Can a technical person then handle this seemingly formidale task? I emphatically say yes! I believe there is a wealthy reservoir of knowledge just waiting to be topped and that industry would be very much amise to not top it. I'll be the first to admit that not all technical people will make good instructors simply because they do not have the required skills. I would also say not all so called educators can make good technical instructors. I am reminded of the story about an elderly professor who had spent his entire life

studying in one university after another. He had knowledge, degrees, and titles that would not quit. On his return home after achieving his final degree, his ship was wrecked and sank. He, being the only survivor, grabbed on to a piece of debris and floated to a small grassy island which supported only a few trees and a single, lonely cow. Rescuers found him there dead from starvation because he did not know how to milk a cow. Of course, this is a fictitious story but there is a message.

I believe there is a need for a good screening process for both the technician from industry and the degreed educator. Technicians may need support and training in the methods of education and degreed people may need the same from the technical standpoint.

By comparison with my fellow degreed instructors, I feel I have been quite successful as a technical instructor for the past seven years. Many of my students have thanked me for sharing my knowledge and experience, which in some way helped them to become sucessful technicians. An by-golly, as I see it, no matter how you slice it, teaching others to be technicians that can diagnose a problem and properly repair it is what this conference is all about.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

HOW DO YOU RECRUIT COMPETENT INSTRUCTORS?

WILLIAM RICH

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As you have heard from previous speakers, educational background and technical competency of potential instructors are two essential qualifications. In recruiting, the two qualifications should be foremost on a position announcement. I might add that a lot of homework should be done to determine the exact requirements of the position. The position announcement is one of the tools that can be used to advantage in recruiting teachers, and as such should be worded carefully to give essential information about the position without going into a lot of detail.

In developing a position announcement there are several things to pay particular attention to: (see exhibit no. 1) The title of the position, and a description, the qualifications which should include educational background and work experience. The assignment and salary and benefits. The starting date and how to apply, the deadline for applications, and last but not least, a statement about the institution being an Equal Opportunity Employer. More about that later.

The application form is the method of gathering some information about the applicant. What information can you ask for? The usual things: name, address, phone number, education, work experience, references, and thats about it. Things that are inadvisable to ask for on an application form are: sex, marital status, race, religion, color, birthplace or date, or any physical or mental disabilities. It use to be that teacher applications had to have a photograph of the applicant, but not any more. You should not ask about clubs, social fraternities, societies, lodges or organizations other than professional or trade organizations. You should not ask about any arrests or convictions. So the application now is really only essential credentials.

Back to the matter of Equal Opportunity Employment. This statement on the position announcement means that the institution is in compliance with federal and state Affirmative Action rules. In Iowa we have the Iowa Civil Rights Commission that spells out what target groups are affected by Affirmative Action requirements. In turn, each school must have a plan of Affirmative Action. Anyone who is developing position announcements would do well to review their schools Affirmative Action policy.

Position announcements are sent to representatives of selected target groups, as identified by the Iowa Civil Rights Commission, to make sure that such groups are informed of possible job opportunities. Position announcements are also sent to teacher training institutions and universities in Iowa and surrounding states. Announcements are also sent to private placement bureaus and Job Service of Iowa.

In Iowa one of the most effective media for advertising teaching positions is the Des Moines Sunday Register. We use both the "teachers wanted" section and the classified section listing jobs for Ag. Equipment Mechanics. Local daily papers are also a good bet. Many times the position can be filled with a person that lives within a 25 mile radius of the job site.

Bulletin boards ub shopping centers and other public areas may be a good place to spread the word of an opening. Some schools post notices of position openings within their own system first to give their own staff an opportunity to apply.

In addition to the more formal method of advertising, the "grapevine" or word-of-mouth method may be effective in finding applicants. Program advisory committee members should be given the opportunity to help spread the word about a teaching position opening in the Ag. Mechanics Program. People who are in the Farm Equipment business are prime candidates as teachers of Ag. Mechanics.

Under the present economic conditions, local farm equipment dealers and manufacturers may be willing to help layed-off employees learn about teaching positions.

The final teacher selection process is the personal interview. The interview process is the means of separating the likely candidates from the also- ran's.

The usual process is for a number of people at the institution to interview the candidates. They may do it as a committee or have the candidates talk to each interviewer individually. The interviewer involved will likely be a department chairman, a Dean or director, and possibly the superintendent. A good tool to use in the interview process is some kind of a form for taking notes. It serves to remind the interviewer to see or ask about certain things, such as work experiences, hobbies, and educational philosophy. Questions that are to be asked of all candidates should be prepared in advance and the setting for the interview should be as private as possible. Be prepared to answer questions about the position opening. Each candidate is entitled to as much information as you can possibly give.

Interviews should be planned with adequate time for questions and answers from the candidate as well as from the interviewers. In scheduling interviews try to be accommodating to applicants that are emplyed elsewhere at the time.

After all candidates have been interviewed a decision should be reached as soon as possible and all candidates should notified that the position has been filled, and the winning candidate informed of his selection.

As with any endeavor, careful planning is essential to carry out a well ordered and organized search for competent, well qualified instructors. They are out there and it is critically important that we do the best job we can in selecting the best possible person for the job.

Teachers for Quality Ag Mechanics Instructional Programs

Recruiting and Providing Quality Instructors

Howard P. Johnson

Reaction: On Recruiting Competent Instructors

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This morning Larry Munton raised a question about source of students. It would appear that recruitment effort may become more important for the following reasons:

1. The pool of students graduating from high school is dropping and will continue to drop until about 1992.
2. The percentage of people associated with agriculture will be smaller.
3. The level of sophistication of farm machines is increasing.

This indicates that there will be more competition for available people.

On Job Description

I suggest that required and preferred experience categories be requested to aid in support of selections made. I also suggest leaving the completion date of any required degree open or flexible as it relates to job starting date. Flexibility on these points may be useful when meeting equal opportunity requirements.

On Information in Application

Mr. Rich suggested that physical disability information be left out of the application. While it may not be in the application, those interviewing a potential employee should know about a disability. It could be hazardous in a shop and it might affect his or her potential as a teacher.

On Advertising

Some other personnel sources are:

1. Professional organizations as National Vocational Agriculture Teachers.
2. Magazines as Agricultural Education.
3. In the universities contact

   Departments of Ag Engineering (Ag Mechanics)
   Departments of Ag Education
   Agricultural Placement Offices

On Word-of-Mouth Information

Established Agricultural Education instructors are a reliable source of names of recruits.

On Interviews

People interviewed should be requested to give a presentation to your staff for evaluation. I suggest that your staff have a part in the selection process.

In closing, I would make some general comments related to recruiting. If you are interviewing high school teachers, review carefully the level of competence. Look for "team member" relationships in the recruit. How does he or she work with others? How do his or her skills complement the skills of your present staff?

The personality of the administrator will influence recruiting. We live with restraints; this may be a positive or negative influence. Finally, good staffing affects future recruiting as well as the number of students you may have.

RECRUITING AND PROVIDING QUALITY POSTSECONDARY INSTRUCTORS

BASIC QUALIFICATIONS LOOKED FOR IN AG. MECHANICS INSTRUCTORS

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Walter Nechville
Ag. Mechanics Instructor
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1. Each instructor must meet "State Requirements for Certification"
   A. These requirements are considered to be the minimum to function effectively in a teaching assignment. An attempt has been made to have requirements which do not screen out good potential teachers.
2. Masters Degree if possible
   A. Due to the technical nature of farm equipment, it is important that the instructor has good mechanical experience and a good mechanical aptitude. This must be further augmented with an understanding of the principles and concepts used in farm equipment design. With a scientific background, a person is able to approach problem-solving situations in a more analytic manner, thus replacing the trial and error approach to repairing malfunctioning equipment.
3. Two to four years of teaching experience
   A. Teaching experience is important because it allows the instructor to prove that he/she has had success in a teaching environment. That success would also indicate that the individual is a "self-starter" and is able to work without supervision.
4. Recent trade experience
   A. Recent trade experience is important because it provides the instructor with a sound knowledge of current practices as related to shop management and equipment service techniques. The instructor may also keep up-dated by attending service schools, studying sales literature, service literature, and reading trade journals.
5. Likes people and has an honest desire to help them
   A. As an instructor, you deal with many groups of people:
      1. Students
      2. Co-workers
      3. Cooperating dealers
      4. Administration
      5. Public
6. One who is willing to listen and accept new ideas and changes as a part of progress
   A. Computer aided instruction
   B. Computer diagnostics
   C. Component exchange
7. Must be able to develop and operate on a pre-arranged budget
   A. Write service equipment specifications
   B. Estimate quantity and costs of instructional equipment and supply materials
8. Not allergic to paperwork
   A. Curriculum development
   B. Exam construction and evaluation
   C. Student evaluation - exam and project grading
   D. Prepare bid forms
   E. Preparing requisitions for equipment and supply orders
   F. Maintain up-to-date service library and parts microfiche
   G. Review work orders on equipment being repaired in the shop
   H. Checking student part orders prior to ordering necessary repair parts
9. Willingness to work more than eight hours per day
   A. Advisory Committee meetings
   B. Agri-Business Club advisors
10. Those qualifications sought by every employer
    A. Positive attitude
    B. Confident
    C. Honest
    D. Trustworthy
    E. Responsible
    F. Reliable
    G. Dedicated

Recruiting and Providing Quality Post-Secondary Instructors

What do you look for in Ag Mechanics Instructors, Basic Qualifications.

Dwight Mobley

Reaction to remarks made by Walter Nechville

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I wish that every post-secondary instructor of agriculture mechanics could be at this conference if for no other reason than to realize how valuable they are to the industry and to receive recognition for their invaluable skills and abilities.

In response to Mr. Nechville's comments on educational requirements, I would add that not all states have the same minimum educational requirements for instructors. For example, Illinois requires only that they meet the 2000 hours of related work experience to become vocationally certified to teach agriculture mechanics courses in the Associate and Applied Science (AAS) degree program. A Masters Degree in the curriculum area is required for college transfer courses that have been accepted by the 4-year institutions.

Trade experience is helpful but mechanical aptitude is a necessity for successful instruction in the classroom and shop.

Classroom management techniques are very important and these probably cause more hardships or even failures for those new instructors with only trade experience.

Other essential ingredients for a successful instructor are a winning personality and willingness to work that extra time to help the student achieve.

The successful instructor must also have an open mind to suggestions and new ideas and be willing to upgrade his teaching skills via in-service training, college classes and work experience.

KEEPING POST-SECONDARY INSTRUCTORS TECHINCALLY

AND EDUCATIONALLY COMPETENT

INDUSTRY'S ROLE IN KEEPING INSTRUCTORS TECHNICALLY

AND EDUCATIONALLY COMPETENT

BENE L. WINDSOR

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1. Due to the work load of most Ag Mechanics instructors, where some teach during the day and also some night courses; it is often hard to get time off to attend service schools sponsored by implement manufactures. Maybe the manufacture could offer more sessions during summer, as this seems to be a lighter work load time, or where the instructor could attend when they are on a quarter, semester, spring or Christmas break.

2. In some educational institutions of gaining advancement on the pay scale to compensate time spent in attending service schools. We should be working towards a way to develop some vehicle so college credit can be received for attendance of service schools.

3. In some cases there is a breakdown in communications between administrations and faculty. Possibly industry or area service personnel could or should attempt to schedule school facilities for monthly service meetings, or customer maintenance to promote a better Public Relations between Industry and Administrators in Education.

4. From observations at the conference some states do not have a state wide post secondary Ag Mechanics Teacher Association. The consensus of group #1 was to have Industry cooperate in planning a program, and attending meetings for such groups. In Illinois association is known as State Wide Ag Mechanics Advisory Committee.

Respectfully,

Bene L. Windsor

Bene L. Windsor

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Industry's Role In Keeping Instructors Technically And Educationally Competent

Henry Torkelson

Henry Torkelson
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Topics And Issues

There were eight members in my group, which consisted of educators, dealers, administration, and service representatives from John Deere. The purpose of our group was to obtain a better understanding between industry's role and the educator.

Our topic was industry's role in keeping instructors technology and educationally competent. Some of the views given by the group were as follows:

1. All agreed factory schools are fine but should be scheduled so all could attend.
2. Schools should be classified so the instructor would know what level is being held. For example, a beginner's class or advanced schooling.
3. It was an unanimous opinion that all instructors or personnel should be paid their salary plus expenses so there would be an incentive to attend these schools.
4. It was unanimous dealership schools should be available to instructors and their students. It would alleviate travel time and loss of class time.
5. The field man should plan to spend time at the college level to advise of the changes and updates and make available to the instructors all new technical changes.
6. All felt old manuals should not be discarded but given to schools. If dealerships have training films the schools should be able to borrow them when not in use at dealerships.
7. All agreed loaning of units from dealerships would expose students to new technical changes. John Deere has a rental program for this purpose but some schools cannot afford obligation.
8. Student evaluation.
   When students are On-The-Job-Training, all agreed dealers should be honest with the instructors and student. The instructors could see his shortcomings and be willing to update himself on the new technology that is being used today.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Keeping Post-Secondary Instructors Technically and Educationally Competent

Cletus Fontaine
Reacting to:
Bene Windsor, Instructor, Ag Mechanics, Carl Sandburg College, Illinois
Henry Torkelson, Instructor, Ag Power and Machinery, Iowa Lakes Community College

Cletus Fontaine
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Workshop Chairman reported:

1. "Industry must offer more training sessions and particularly during vacation breaks."

   Reaction: If industry is to meet instructor needs, they must offer training at a time convenient to teachers.

2. "Industry should cooperate with universities in making college credit available for attendance at service schools."

   Reaction: The concept is good but that's a university problem and not the responsibility of industry.

3. "School facilities should be utilized by industry when delivering and marketing corn planter, combine, etc. schools for farmers."

   Reaction: Utilizing school facilities will help establish dealer-education partnerships. The public relations aspect is enhanced and demonstrates importance of mechanics to school administrators.

4. "Industry should invite teachers to dealer training schools."

   Reaction: Vocational teachers should be made aware and invited to all training sessions planned in their area. Instructors should make their wishes known to local dealers and branch or division managers.

5. "Service representatives should stop in at local vocational-technical schools when in the area."

   Reaction: That concept would provide for excellent articulation.

6. "Service manuals, which are to be discarded by local dealers, should be donated to local mechanics' teachers."

   Reaction: These materials are valuable to teachers and, if not obsolete, can assist in the local educational program.

7. "On-the-job reports, submitted by local dealers to local schools, should reflect an honest appraisal of the trainee."

   Reaction: The real responsibility rests with local schools in apprising the dealer of expectations.

Additional Reactor Comments

Industry can assist in keeping instructors technically and educationally competent by:

1. Planning programs which will update practicing teachers.
   a. Conduct workshops at company training sites.
   b. Conduct service schools at local dealer sites.
   c. Conduct service schools at local vocational school facilities.

2. Display, review, and market latest materials and aids available to local schools and teachers. Industry developed materials and aids are excellent, but will not be utilized if teachers are not aware of availability.

3. Any training provided by industry must be "hands-on." The practical application, coupled with minimum theory, will be best accepted.

4. Industry must apprise state staff with responsibilities for in-service education of new technology, innovations, obsolescence, etc. New direction must be suggested. State staff people are not "experts" but do coordinate in-service training schools.

5. Industry must provide for summer employment or "intern" stations for practicing teachers. "Hands-on", as an employee, keeps teachers on the cutting edge and in the world of reality. This takes dealer cooperation and understanding.

   Exchange of programs, whereby teachers go into the industry and industry personnel comes into the classroom or shop, must be explored.

6. Industry must willingly participate and provide a leadership role on local advisory committees. Pointing out curriculum, facility and equipment needs will "shape up" instructors. Instruction provided must follow industry technology. Instructors don't teach what they don't know. Industry must point out competence needed.

7. Industry must promote "open communication" by informing dealers, branch and division managers, that their responsibility is to extend a hand to teachers, local administrators, state staff, and others. All concerned need to know where to go for assistance and help.

   A true partnership can exist if all concerned know each other on a personal basis. Communication goes both ways. Industry and education, as cooperators and partners, will achieve the objective of technically and educationally competent teachers.

KEEPING POST-SECONDARY INSTRUCTORS COMPETENT (TECHNICALLY AND EDUCATIONALLY)

University's Role in Keeping Teachers Technically and Educationally Competent

Mervin D. Bettis

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The group stated that very little in-service training is available for community college instructors or the university professors. Most of this type instruction is provided for the high school teacher.

Industry can provide workshops that are valuable to post-secondary teachers during school vacation times and they can reciprocate by guaranteeing members of their group to fill the classes. Someone needs to get them together.

The university professors can go to community colleges and help the instructor who has industry experience to develop and organize his curriculum, build exams, and instill confidence in his teaching.

Some of the group had gone to various industry workshops. We all need to be on industry's mailing lists.

Keeping Post-Secondary Instructors Technically and Educationally Competent

University's Role in Keeping Instructors Technically and Educationally Competent

Eldon R. Chapman

Eldon R. Chapman
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Our group approached this topic from the following two areas:

I. Technically (What to teach)

A. The university should allow credit for workshops which are presented by industry.

B. The university should work closer with businesses which can provide instructors for technical areas which would be offered by the university and allow credit for these courses.

C. The university should provide in service classes for one half day or more which would not necessarily be for credit.

D. The university should include job experience for the students and to allow credit for this experience.

II. Training Educationally (How to teach)

A. This has been the strong point of the university and they should continue to do a good job in this area.

B. They should encourage teachers to take inservice components on methods of teaching.

C. They should direct the instruction into three areas and teach according to the group.

(1)Secondary(2)Post Secondary (3)University

D. The university should help the technician to gain experience in the methods of teaching by offering inservice courses.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

University's Role In Keeping Teachers Technically And Educationally Competent

David L. Cattron

Reaction to remarks by: Mervin Bettis and Eldon Chapman

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#1. The nature of Ag Mechanics instruction at the post-secondary level varies greatly among the five states represented at the conference, therefore, the role of the university in each of the states may differ as it applies to helping the post-secondary instructor.

#2. We agree that the universities are not geared to high technological training --

#3. However, there is a serious terminology problem in the area of "Ag Mechanics." To some, the term applies to training technicians in the area of farm power and machinery, while to others of us the term includes power and machinery, as well as electric power and processing, structures, and several other categories which may even include horticulture mechanics. It is then difficult to fully assess the validity of statement #2 since some universities may be able to provide technical training and continuing education in some of the diverse areas of "Ag. Mechanics."

#4. We agree that the universities can provide the training to make a teacher "educationally competent," especially if that involves a conventional teacher education program. We further believe that the universities can assist new teachers regardless of background in obtaining bachelors or masters degrees in education. We currently see very little "updating" beyond that point, although we see some special needs in that area. An example would be a course on dealing with the "new adult student."

#5. We recognize that the universities face a problem of finding students in sufficient numbers to offer some of the courses that we could use.

#6. We see a need for the universities to grant credit for workshops, such as those offered by Deere and Co. (This has been done in a few cases.)

#7. The universities could develop or reorganize some of their education courses to fit the special needs of the post-secondary instructors.

#8. We agree that the universities can help provide teaching materials and general support to the post-secondary Ag Mechanics instructors.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Post-Secondary Schools Role in Keeping Instructors Technically & Educationally Competent

ROGER BECK

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A. Administration must work directly with their staff in developing plans - policy and procedures that will provide opportunities for the instructors to keep themselves technically and educaticnally competent. Plans that you might consider are:

1. In-Service Training.
2. Policy making in general.
3. Leave policy.
4. Budgets in general (plus travel budgets and substitute pay budget).
5. Certification and re-certification requirements.
6. College credits available for different types of workshops.
7. Staff evaluation process and procedures both in the technical area and educational area.
8. Total support from administration both in time and dollars to keep the Ag instructor competent; we must be positive.

B. Staff Motivation

1. O.J.T. programs are important and valuable in getting staff out into the dealerships and visiting owners, mechanics and shop foremen.
2. Workshops/schools: Ag instructors must be kept informed and encouraged by administration to attend these training sessions.
3. Administrative Support: Instructor must know that there is a qualified substitute working with his/her students and that the educational process will continue with a limited amount of problems.

C. High Tech:

1. Instructors should stay with the basics and develop these skills with the students; and then if & when time permits, move into the more "High Tech" areas of instruction.
2. Instructors must keep themselves up to date on what really is going on out in the Ag equipment repair shops - "The Real World".
3. Dealer visitations: Instructors can find out what the shortcomings of their graduates are by visiting with the employer. It is possible that we would need to revise the curriculum and our instructional process.
4. Ag dealerships: They need to respond back to the school administration if they have concerns about graduates.
5. Instructors must stay in contact and use their advisory committee members.

Teachers for Quality Ag Mechanics Instructional Programs

Post-Secondary School's Role in Keeping Instructors Technically and Educationally Competent

Donald G. Schwarz

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Participating in this discussion topic on the post-secondary school's role in keeping the instructors competent were educators Perry Brooks of Columbia, Mo., Harold Crawford of Ames, Ia., John Volta of Mankato, Minn., Larry Korte of Danville, Ill., Bill Doerr of Carbondale, Ill., and Don Schwarz of Milwaukee, Wis. Representing industry was Bill Ryden of the Minnesota/South Dakota Farm Equipment Association.

This group further defined and limited the topic to the responsibilities of the school's governing board and its administration in keeping instructors competent.

In general this can be accomplished by permitting and providing for participation in various types of "upgrade" training programs or activities and then to follow through by providing leadership and encouragement. Specifically, the school should:

1. Provide for and encourage instructors to participate and "upgrade" training within industry, at colleges, and at universities during the academic year as well as during recess periods.
2. Provide continuing in-service activities in teaching methods and techniques. Such activities should be both inter-departmental and intra-departmental.
3. Provide a sabbatical leave program for instructors to work/study in industry. Such leave programs should provide for short leaves of a few days as well as leaves of a full year's duration.
4. Encourage instructors to communicate regularly with local dealerships and related businesses and incorporate those businesses into the training program in various ways.
5. Provide budgets and budget management in a manner that will, to the greatest extent possible, provide for the best in equipment and supplies.
6. Secure recognition and support from the land grant colleges for vo-tech programs and its instructors.

Post-Secondary School's Role in Keeping Instructors Technically and Educationally Competent

Dr. Harry W. Pry

Reaction to Remarks Made by Roger Beck and Don Schwarz

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As many others have already commented, we basically agree with the reports from workshop groups 3 and 8 that the administration must work directly with faculty to promote the maintenance of competent instruction. There must be an institutional commitment to keep faculty technically and professionally competent. The key is the development of a system for institutional motivation to promote a desire for faculty to keep abreast with changes in industry and needs of students enrolled in programs. If the administration does not have this commitment, then faculty must encourage budgeting and a reward system for faculty to become motivated. The reward system may include financial support, certification, salary increments based on rank, and tenure advancements for participating in technical and professional development. As an example, our institution at Southeast Missouri State University has made a commitment for professional development. Funds are budgeted and allocated to individuals submitting proposals for technical and professional development. Faculty must submit proposals and show a sustained effort in professional development to be considered for advancement in academic rank and tenure. After reviewing the resumes of individuals applying for teaching jobs, it is obvious that most will not have all of the competencies required for performing all the duties demanded in a teaching role. The institution and administration can help solve the problem by allowing teachers travel budgets, allowing leaves of absence, providing in-service training, and giving credit for technical training received through industry.

In summary, institutional motivation is provided by an administrative commitment. Faculty will participate to keep instruction technically and educationally competent.

Industry And Education . . . Partners In Ag Mechanization

The Ag Mechanics Instructor's Role In Keeping Technically And Educationally Competent

Ron Della Croce

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Topics And Issues

The eight member group consisting of educators from two year colleges, four year universities, John Deere dealership owners, and factory service representatives came to the consensus that the instructor role in keeping technically and educationally competent is the responsibility of the instructor. The instructor should set priorities in the following:

1. Review and purchase updated service training material. Investigate the possibilities of a lending program from dealership.
2. Make a conscientious effort to return to industry for update experience.
3. Investigate the possibilities of attending service training update session at local dealerships.
4. Notify training center to have their name included on the mailing list for training session schedules.
5. Make themselves known to field representative and seek their advise.
6. Keeping in contact with four year institution, and stay academically updated in new teaching techniques.
7. Two year technical institution instructor should make themselves available to four year institution teacher trainer.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

THE AG MECHANIC INSTRUCTORS ROLE IN KEEPING TECHNICALLY AND EDUCATIONALLY COMPETENT

KEN DROLLINGER

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The first issue that needs to be addressed by the instructor, who is attempting to keep competent, is to evaluate his or her own personal needs. This personal evaluation process will determine if a person needs to seek technical or educational competencies.

This panel finds the instructor is responsible for achieving the following to remain technically competent as an Ag Mechanic Instructor.

A. To seek out and attent manufacturer's in-service training sessions. It is also the instructors role to seek necessary funding to attend these schools. This does not mean the instructors should pay for this training out of his own pocket.

B. To obtain and study current publications pertenate to his or her program area. Examples, Technical Manuals, Repair Manuals, Trade Publications and S.A.E. Publications.

C. To join and become active members in technical organizations such as the Society of Automotive Engineers, Assoc. of Diesel Specialists, and Fluid Power Specialists. In such groups we find much technical and training available.

D. To seek out situations that would allow the instructor to gain in actual work experience. Many instructors have periods of time in their teaching loads that would allow them to go into industry and actually work as a mechanic. Such knowledge gained in this way can prove very valuable.

E. To establish and maintain personal contacts with people in manufacturing and in the dealerships. Current and up-to-date information may be obtained this way.

F. To attend agricultural equipment trade shows. This gives the instructor an idea of the new products coming out.

G. To participate in a personal skills and development program. Instructors need to constantly practice the skills needed to effectively teach others.

If the instructor wishes to remain educationally competent he or she must do the following things:

A. Join and become active in some of the educational peer organizations such as State and National groups.

B. Not only participate in, but have input into staff development seminars at your school. This makes for more interesting and more beneficial training.

C. For those instructors that have come from industry, seek out and work towards the completion of a B.S. Degree program.

D. For those who already have a B.S. Degree, take graduate courses.

E. Take sabbaticals that would allow you to work in your program areas.

The Ag. Mechanics Instructor's Role in Keeping Technically and Educationally Competent

Dale Sanderson

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It's up to each interested instructor to make time to go to all the technical seminars as possible. This has to be an individual effort.

The instructor has to keep up to date also by reading periodicals on any subject pertaining to the area he gives instruction on the subject taught.

Keep communication lines open to industry and higher educational institutes, so with full cooperation, the cost factor to each instructor is kept as low as possible for travel and tuition costs.

I feel that to be a good instructor, you must have dedication to the program you teach as well as to the students you instruct.

Attend as many summer programs as possible on your own time that are beneficial to you and your program.

The ability to keep communication open to your administrators on the importance of the individual seminars that will be beneficial to you and your program.

Try to keep your program up to date and informative to students. This is done best if you pay attention to your evaluation reports by students and State Evaluators.

Continual updating of curriculum which sometimes means dropping the parts of the program that no longer have a valid importance, and adding things that are more important as times and years go by. Listening to the Advisory Committee advice as to what should be changed or added is important. This means being able to change as times and machinery changes in your particular area.

More communication between different states, as this meeting, means alot. You find out different ways and ideas of instructing that might be better than your own. This type of meeting was a great asset, I feel, for all participants.

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS

Ron McNett

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Several important items were discussed at this session:

Discussion was held on how industry and education can work together in the future. It was also suggested that teacher educators from the vocational-education division in the university system could gain and contribute in future sessions such as these.

Discussion was held that emphasis should be placed on the need of vocational education to have guidelines from industry as to what they need and what level of competence they want from our graduates. These suggestions could come from a manufacturers or equipment association.

"I believe that a conference of the nature of this one would be of most benefit if conducted on an every other year basis."

H. Edward Breece
Professor & Chairman
Dept. Of Agriculture
Western Illinois University
Illinois

CURRICULA—GOALS AND PROBLEMS

(Session Chairman - Bob Wolff)

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CURRICULA - GOALS AND PROBLEMS

POST SECONDARY SCHOOL CURRICULA

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Training for new technicians is primarily obtained from four sources: manufacturer training, dealership training, post-secondary school training, self-training.

All training should have a common goal, which is satisfying customers. Customers expect machine repairs and preparations which are timely, cost effective, and reliable. In addition to the mechanical portion of a technician's job, he must also be able to advise the customer about proper operation and maintenance. This involves effective communication.

Manufacturer training is primarily concerned with three areas. The first is teaching specific systems, such as electrical or hydraulic. Any new system must be taught to all technicians who work with that system. The second area of instruction is system diagnosis, which is probably the most critical. The dealership cannot afford excessive diagnostic time. The manufacturer has diagnostic procedures which are unique to his systems, and these procedures must be understood by the technicians. The third manufacturer responsibility is keeping technicians advised of equipment changes.

The manufacturer does not have time to cover basic skills and older systems. This would rob time from teaching on new and current machines.

Dealership training includes shop operations and machine repairs. The new technician must understand his responsibilities in relation to daily tasks, such as making parts requests. System diagnosis and training on older systems is also a responsibility of the dealership. This is usually a practical exercise with advice from an experienced technician. The dealership can also conduct formalized in-house training.

The responsibilities of instruction in post-secondary schools cover a wide variation of topics. The technical instruction no doubt deserves the most time in a course of study. Basic skills must be mastered before a student is ready for employment. As an example, he should be able to adjust the valves in an engine. The proper use and limitations of a micrometer, plastigage, flow rater, and volt-ohm-ammeter are a few tools which must be mastered. The use of measuring tools is limited to an individual's knowledge of available reference manuals. Another area which is becoming increasingly important is the capability to interpret standard electrical and hydraulic symbols, such as those established by the joint industries council.

Component terminology sometimes causes a communications roadblock. Are a pressure regulating valve, a pressure relief valve, and a flow divider valve all the same? How does a clutch compare to a torque converter? Is engine torque the same idea as torque on a bolt? A student ready for employment should be able to answer similar questions so he can communicate his thoughts.

The differences and similarities in various systems need to be understood. The comparison of gasoline to diesel engines is important, as well as comparison between one cylinder and V-8 engines. Power trains can be mechanical, hydraulically engaged, or fluid. Hydraulics, electrical, and air conditioning systems all use pressure, flow, and restrictions. Therefore, basic concepts apply to all three. Students must understand basic systems.

Problem diagnosis is important at every level of training. Junior colleges should concentrate on the cause and effect relationship of the various factors in a system, such as how restrictions affect pressures. Diagnosing systems of all manufactures may dilute understanding, so an instructor might want to stay away from specific systems and procedures.

Another area of concentration is proper techniques for assembly and disassembly. Failure diagnosis can never be overemphasized. Too many times a technician repairs the symptom, but not the cause. Efficient repair is necessary in a dealership. The last part of a repair is testing to insure the problem is fixed.

An area which is becoming less important at dealerships is injection pump repair. This is because of the investment and expertise which is required. As a result, less emphasis is needed on injection pump training. A technician does need to be able to determine if a specific problem is in the injection pump or the engine. Injection pump problems can then be taken to a specialist. An advanced injection pump course should be available for those who want to go beyond the two-year course.

Combines, forage harvesters, planting, and tillage equipment are becoming more complex. Most graduates want to be tractor technicians, but skilled technicians are also needed in the equipment area. Field operation is another important part of training.

Management should also be included in a student's training, although the time requirement is much lower than the technical area. A technician needs to have a feel for what the dealership manager must contend with on a day-to-day basis. Areas to review are time accountability, effect of rework, training costs, overhead costs, and many others.

Personal training will help the student make himself more marketable. One area which is extremely important is work habits. A technician should also realize that he is an important part of the dealership operation. Before applying for a job, a student should know what would be a reasonable beginning wage, as well as reasonable expectations for advancement. But instructors must also temper this type of training with practical logic. A student graduating from a community college must realize that he is new, inexperienced, and untried. His expectations should be reasonable, not grandiose.

Another area of personal training which cannot be overemphasized is communications. A student should have practical experience on how to interview for a job, how to talk with customers, and how to make a presentation at a dealership customer meeting.

Work-study programs which put the student in the dealership environment is probably the most important part of his training. It should begin as early as possible in the course of study so the student can decide if he is in the correct career, and include as many hours as practical. Instructors must work with dealers to insure that students are properly utilized. Work-study should be a requirement for graduation.

Another important part of an instructor's job is noncurricula training and evaluation. Instructors must instill students with a real desire to be a technician. He must insure that graduating students are trainable and receptive to suggestions. He must eliminate nonachievers. Producing technicians which cannot do the job, cost dealerships time and money, and reflects poorly on the school. Instructors must make every effort to provide dealerships with sound technicians.

Self-training is the link which combines all other training. If a technician is to excel, he must constantly educate himself. He must ask questions and study beyond normal requirements. He must apply the training which he receives from schools, dealers, and manufacturers. Also, instead of keeping the knowledge to himself, a good technicain will give that knowledge to others.

Post secondary schools are an important part of the training for dealership personnel. Non-technical as well as technical courses are necessary to produce a properly trained individual. The purpose of the training is to prepare the student for further training, which has to be a constant process to provide proper satisfaction for today's customers.

CURRICULA - GOALS AND PROBLEMS

PERSONAL VIEWPOINT OF CURRICULA

LARRY KORTE

REACTION TO REMARKS MADE BY RALPH HANES

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RESPONSE TO PERSONAL VIEWPOINT - CURRICULA

I. Mr. Hanes mentioned Four Sources of Training

   A. Manufacture
   B. Dealership
   C. Post - Secondary
   D. Self
   E. All with a common goal - satisfying customers

II. Manufacture Training

   A. Greatly needed for specific training
   B. Cannot & should not teach basics

III. Dealership Training

   A. Shop operations
   B. Instruction by other employees
      1. Possible reluctance because of inadequate feeling
      2. Embarassed to give a class in front of peers

IV. Post Secondary

   A. Prepare student for dealership & manufacture training
   B. Basic skills
      1. How, with what, why, when
      2. Many institutions are becoming too detailed
   C. On Job Training Is Very Important

V. Self Improvement - A Must

VI. Summary
   A. Back to basics
   B. Support & work with each other

CURRICULA-GOALS AND PROBLEMS

PERSONAL VIEWPOINT OF CURRICULA

KENNETH ROSS

Reaction to Remarks Made by BILL HOFFMAN

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I enjoyed hearing the views of all the panel members, but I listened to Bill Hoffman's views with special interest. Bill's viewpoint is that of a consumer who must be happy with our product. He represents the agricultural equipment dealers. It is the local agricultural equipment dealers, dealer service people, and other concerned industry people who through our program's advisory committee establish the curriculum at Des Moines Area Community College. It is to my students' best interests to listen to people like Bill Hoffman.

I am confident that a graduate of our program at DMACC would have few problems in the specific areas mentioned by Mr. Hoffman (i.e.: proper use of parts books and proper descriptions of work completed when filling out shop tickets). Our advisory committee has expressed the needs of the agricultural industry in the local area. Because of this, our curriculum reflects their needs including specific courses, such as "Interpretation of Technical Publications," that are designed to meet the needs of students and dealers.

My problems with curriculum do not concern what to teach as much as how to transform a freshman student into an individual the Bill Hoffmans of the Mid-West expect as an employee. The enrollment at DMACC is open; that is, if they have a pulse and can pay the fees, students are allowed to enroll. The only limit is class size. This can produce a class with a wide range of backgrounds, interests, and learning abilities. The problems surface when I have an individual with a third grade reading ability. It is impossible for this person to follow the instructions provided in an operator's manual, parts manual or technical manual written on even a junior high school reading level. The present 20 month length of our course requires the technical information to be presented in a rapid fire manner. There is not time to upgrade the individual's reading skills. Reading, writing, math, and simple problem solving skills all pose similar problems. I can teach the technical skills if I have persons who come into the program with the basic learning skills.

I would like to see improved coverage of the basic skills for ALL individuals in the grade and high schools. Do not let anyone slip through. Don't pass or graduate someone because it is the easiest thing to do. It is not fair to expect someone at the post-secondary level to do the job that should be done at the grade or high school level. And, it is not right to cheat a student of a chance to suceed in acquiring the advanced training they want.

In closing, I would like to address my remarks to the dealers who hire graduates of the Agricultural Technical Program at DMACC. Your new employee has received a concentrated education in the technical and business areas suggested by an advisory committee composed of your peers. But he or she is not a seasoned technician. They will make mistakes in their new environment. They have quite a bit of knowledge but lack the judgment that comes only from experience. Be understanding of their mistakes. While their mistakes may be numerous, they should not be as severe as those of an individual without such technical training. The progress that this new employee will make towards being a productive member of your shop work force should be superior to that of an individual hired fresh off the street.

The individual who successfully completes an Agricultural Technical program can better digest the information provided by his or her work experience. Thus, after 4-5 years on the job, this individual would have the productivity of an individual who would have 8-9 years of similar work experience without the prior technical training. This means improved efficiency and increased productivity which can be equated in dollars and cents. This is a goal we can all live with.

CURRICULA - GOALS AND PROBLEMS

Agricultural Mechanization Curriculum Development Personal Viewpoint

Robert Krumwiede

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INTRODUCTION

Developing a valuable program in agricultural mechanization can be a very difficult task because it must simultaneously satisfy the needs of two different sets of "customers" within the confines of the educational institution. On the one hand the program should meet the needs of the machinery industry as the needs exist today and it should also develop skills which will allow the graduates of the program to adapt quickly to the needs of the industry as it may exist tomorrow. The program also must meet and satisfy the needs, and desires, of the students who are entering the program.

In trying to meet the needs of these two groups one must also recognize that not all educational institutions are able to fully meet the financial and physical commitments desired for the ideal program. For these reasons and the reasons given above, it is necessary that all parties maintain open discussion so that appropriate adjustments in the program can be made to satisfy everyone in the best possible manner.

CURRICULUM CONTENT

In developing a high-quality curriculum in agricultural mechanization it seems necessary that the program develop certain technical competencies as well as certain general competencies in the student.

Technical Competencies

Technical competencies would consist of basic knowledge and skills in the construction, inspection and service of engines, transmissions, hydraulic systems, electrical systems, electronic components, fuel systems and air conditioning systems, just to name a few. In all cases the student should be familiar with the principles of operation and fundamental service techniques of typical components. It would be assumed in most programs that specific skills and techniques peculiar to identifiable transmission models, engine models, etc., would be gained through experience and specialized training offered by the manufacturer and/or the dealer. Educational institutions should concentrate on basic machine principles and on the development of a "common sense" understanding of these mechanisms.

General Competencies

In terms of general content or competencies for the program it would seem that concentration should be given on basic reading ability, communication and speaking skills, mathematics and computer skills. The ability to read and understand written material will be necessary for the student to adapt quickly to changes in the industry and to minimize wasted time in the work situation. A review of training and service manuals commonly used in dealership operations indicates that service personnel must have a reading level ranging from eighth grade to the second year of college, depending on the service manual, in order to properly understand what is printed.

Communications and speaking skills are necessary because, almost without exception, industry personnel are involved in the communication of ideas internally in the organization and externally with the general public. The success of graduates of mechanization programs while on the job is very often directly correlated to their ability to communicate effectively.

In addition to the reading and basic communication skills it is necessary for the graduate of a mechanization program to be able to handle basic mathematical computations with a minimum of difficulty. Even with the advent of computers and calculators of all types, the students must have a "common sense" about numbers and computations in order to be sure that calculations are logical and correct. Such a "common sense" cannot be obtained through total reliance on calculators and computers.

Included with the general competencies required of a graduate it now seems that basic knowledge of computers and computer operations would also

be appropriate. Teaching of this subject should concentrate primarily on knowledge of how to recall information from a computer and a basic understanding of the logic in the operation of the computer. In the near future it may be possible for a service technician to call a computer and get step by step instructions on the diagnosis and repair of a machine. While programming expertise would not be necessary in this situation, some basic knowledge and familiarity with computers will be extremely important.

CONCLUSION

Throughout the teaching of agricultural mechanization programs there should be fundamental and underlying objectives. Various authorities on the Future have given estimates that by the year 2000, 70% to 90% of the jobs that will be available then do not exist today. There are signs of this trend in the retraining programs that have/are being established for displaced workers. This time line puts today's graduates in the prime of their working career in the year 2000. Graduates must be adaptable to these changes.

It is also feared that educational institutions in recent years have been concentrating to a very high degree on the "memory/recall" method of teaching. As a result of this, there have been increasing numbers of students leaving educational institutions who do not have the basic abilities to define and solve a problem systematically and logically. If a basic understanding of machines and mechanic principles can be combined with a solid understanding of problem solving techniques, very high quality graduates would result.

Curricula - Goals and Problems

Personal Viewpoint of Curricula - Instructor

Perry Brooks

Reaction to Remarks Made by Robert Krumwiede

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The following points were found to be well addressed and particularly applicable:

Point #1: Many of the same job titles will not exist in the year 2000, but many of our students and current employees will be still employed. Consequently, our training programs need to be based upon principles and theories that will be applicable in the future. Students need to be trained in the basics, thus they can be trained and retrained for the specifics in the future.

Point #2: Students need to enter industry, prepared to work for any company; utilizing - knowledge, understanding skills and attitudes that are industry specific but not company specific. We need to use a multicolor approach in our training and not depend on any one company for all of our hardware or software. Students need entry level skills. They need to be aware of technical differences between different brands, to the extent that they receive training on use of technical manuals.

Point #3: Students need diagnostic skills and development of logical thinking for problem solving, and understanding of how machines operate is paramount to determining the faulty component and determining cause and effect relationships between systems and components. An understanding of computers can be helpful. On-board solid state monitors and computer diagnostics are sure to be part of our future.

The following are areas that were not well defined:

Point #1: From Robert Krumwiede's outline, "Basic Objectives-Meet the Needs of Industry." My first question is which industry? Agriculture mechanics as defined by ASAE includes: Power Machinery, Soil & Water, Electrical Power and Processing, Structures & Environments, Construction & Maintenance, and Food Processing. Clearly, we need to define more closely which industry we are referring to. Agricultural power is only one part of agricultural mechanics. If our programs are truly vocational, technical, and terminating in employment for our students, then we need to know who those employers are. My second question is how do we as instructors determine the needs of industry? Job analysis, task analysis, and development of competency lists are the avenues by which industry, education and former students will determine what needs to be taught. The question is not how to teach, but what to teach.

Point #2: Meeting the needs of industry as it "exists today" and "as it will exist tomorrow" is a formidable task. Who plans curriculum? Who has the responsibility for today and who knows the needs of tomorrow? Industry must assist educators by letting them know what is on the drawing boards. There is no use planning for the present, because our students will be working in the future. As instructors we need to be on the cutting edge of technology so that our students will be ready when industry is ready.

Point #3: Which schools will be involved? Secondary, post-secondary, or university? Depending on which schools are involved, the curricula or courses of study will vary depending on the terminal objectives of the program involved. The instructor needs to know the vocational intent of his students and determine how the program can best fulfill those needs. Previously, we discussed the needs of industry, but the needs of the students are very important, too. Industry will change because of the needs of its customers. Education must change because of the needs of its customers: employees and employers. Thus, industry and education are tied together in a mutual need relationship.

In summary, Let's get back to basics, in a fast changing future, the basics are building blocks by which students/employers can train/retrain to fit the ever changing needs of industry. Students need entry-level skills that can be built upon by many different manufacturers. Students need to be able to solve problems and use logical thinking to diagnose complex systems into simple solutions. Training needs to be directed to a specific industry, if possible. The needs of that industry must be determined by careful analysis of the jobs and tasks required. Competency studies are necessary. Research can tell us what to teach. Industry

needs to take the lead in identifying the new jobs of the future. Finally, the decision of what is the cooperative role of various schools curriculum needs to be addressed.

Personal Viewpoint of Curricula

David R. Jones

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The environment in which I was raised shaped my life into what it is today.

My father was a handy man about the house and I used to help him as kids do. My interest in mechanics began by watching him and developed more by repairing my bicycles for my paper route. While in junior high I purchased a garden tractor and kept busy mowing lawns, plowing snow and tinkering with the tractor.

My interest in agriculture came from being raised in the small farming community of Geneseo, Illinois and having several friends who lived on farms.

During high school I worked summers and weekends on a farm and it was there that I decided Ag Mechanization was the direction I was headed. Upon graduation, it was off to the University of Illinois to study Ag Mechanics.

I soon found out that my idea of college and the University of Illinois' were two different things.

All throughout high school I studied just enough to get by, because when I went to college I could study just exactly what I wanted to. Wrong! There was math, rhetoric and zoology along with economics. After one year I was ready for a change. I was considering Spoon River College where several of my classmates attended when I heard about Blackhawk East College's new Mechanical Power and Technology program.

Although it was a brand new program, the instructors were quite prepared for the fall semester. The building was an old grade school 6 or 7 miles east of the main campus, and it looked more like a shop than you could ever imagine.

The next two years were the most enjoyable and informative years of study in my life. There were classes on engine basics, electrical systems, power trains, overhauls, hydraulics, as well as injection pumps, harvesting, and welding. Almost all of these classes had extensive labs to compliment the classroom. Spread out over the two-year program were courses designed to supplement the Mechanical Power and Technology classes and further prepare you for work ahead. These consisted of shop management, business management, bookkeeping, physics, and tech. math. Our instructors were always available to talk over problems. Out of class they would eat lunch with us, shoot the breeze, look at a car you might have a problem with. To everyone, they became more like friends than instructors. And in class they would do much more than instruct, they shared their lifetime of experience with us. It became much easier to learn with real life experiences blended in with the textbooks.

During the last eight weeks of college, I was employed by a John Deere dealer under the work seminar class I was taking. There I could see my classroom and lab experience come into play as I performed my first overhauls.

After graduating with an Associate in Applied Science, I continued to work for the Deere dealer. My work there was almost strictly four-wheel-drive tractors and I could tell my education had paid off well.

Today I am a Test Lab Technician for John Deere Harvester Works in East Moline, where I have been for the past three and one-half years. I know my degree from Blackhawk played an important role in landing my job at Deere. My current job responsibilities include stress and fatigue analysis of metal, component testing, and telemetry and computer testing of combines. Although this is different than the work at a dealer, it does require mechanical knowledge and seems to be a good transition from the dealership.

There is no substitute for the experience of "hands on" learning. Many Ag Tech colleges offer "hands on" courses but it is the quality of those courses that counts. At Blackhawk, course projects were always available and the instructors were always there to give you advice.

Knowing the basics, such as how to overhaul an engine, was invaluable when I went to work.

I had taken two International Harvester diesels down and inspected them at school. After putting them back together and hearing them run, I felt a great sense of achievement and confidence. Even though I went to work at a Deere dealership, I knew the basics on how to overhaul an engine.

I found that knowing the basics of overhauls, hydraulics, electrical systems, and other areas made servicing different brands of machinery relatively simpler.

There are a few areas in my course study I would have liked to have seen different. However, it is very difficult to be objective with a program when you are the first class to graduate.

Instruction in specific hydraulic systems is very important. Since no two manufacturers use exactly the same system, troubleshooting a particular system can be quite difficult. Knowing the basics here is not enough and lab work on each tractor system would be very beneficial. I also feel that instruction on adjustments of planters, combines and field conditioning equipment is essential. During school, set-up of plows and planters was covered but very little on adjustments. In-field demonstrations would be helpful along with classroom study. Having only worked on tractors in the dealership and not any set-up work, I felt somewhat embarrassed one day on a service call. I was working on a farmer's tractor when he asked me a question about his planter. I had to tell him I was sorry that I did not know the answer. This is why I feel instruction on more than just tractors is needed.

As I look ahead I see a need for electronic and computer systems courses. It's no secret that tractors and combines are more electronic than ever and it does not look like we're headed back to levers and cables. Even though many components are not serviceable, an understanding of how it works can help in diagnosing problems.

I can easily see computers replacing parts books and technical manuals, possibly with a question and answer format linked to corporate headquarters on service problems. If the technician understands the basics of computer operation, not necessarily the programming, most of the mystery of computers is removed.

In closing I would like to reflect on my decision to attend Blackhawk College. I had almost decided to quit college altogether before I went to Blackhawk. The program there taught me pride and confidence in the work I did. I have never regretted once going to Blackhawk. How would I do it over? Well, now that I'm married, mortgaged, and with two children, it sheds a different light on the subject. I think I would have listened to that one special instructor who told me to go on and get a Bachelor of Science Degree. Instead, now I am trying to do it at night school. I don't know if at 25 you are allowed to give advice to future graduates, but I'll try. First, although it is hard, try to establish a long-range goal. Do you want to be a mechanic all your life? If you are not sure, don't stop at a two-year college, keep on going. If you do, study as hard as you can and try to get experience on many different brands of equipment. Second, get to know your instructors. They hold a world of knowledge in their hands and are just waiting to help you learn. And third, have fun at college. Those are really some of the best years of your life.

CURRICULA - GOALS AND PROBLEMS

PERSONAL VIEWPOINT OF CURRICULA

GERALD VANDERLOOP

REACTION TO REMARKS MADE BY DAVE JONES

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Dave shared with the conference his own personal educational experiences which really pointed out why we need both four-year college degree programs and two-year technical programs. He explained that he first tried the four-year route, but found that there was too much theory involved for him at the time.

To get more hands-on training, he switched to a two-year technical program that he found both enjoyable and rewarding. Major strengths of this program that he noted were: A) Development of the basic technical skills needed to be a service technician, B) provision of hands-on experience, and C) increased interpersonal relationship with instructors. Although the training on tractors was adequate, he felt that a weakness of the program was a deficit of time spent on implement training such as planters, combines and plows.

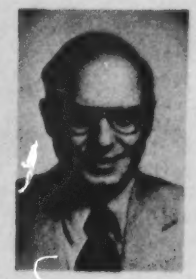
The need for further development and incorporation of electronic and computer courses into the curriculum of the two-year program was brought out.

Dave worked as a service technician at two farm equipment dealerships and is presently employed in the product engineering department at Deere and Company. It was interesting that Dave concluded his presentation by stating that he is now pursuing a four-year degree.

My reaction to Dave's story was that it illustrated the need for the existence of both the four-year and two-year program with their differing emphasis. However, our systems must become flexible enough to meet the changing needs of the student over the course of his career. At the present time, a graduate of a two-year program receives little or no advanced standing when entering a four-year program despite his training and knowledge level. I feel that the needs of industry could be better met by having an individual with both the technical skills of the two-year program and the theoretical knowledge base of a baccalaureate degree.

AGRICULTURAL MECHANIZATION CURRICULUM AT THE SECONDARY LEVEL

H. Edward Breece



H. Edward Breece
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Recognizing that a majority of students in post-secondary agricultural mechanics programs come from secondary vocational agriculture programs, it is important that interested and qualified young men and women be encouraged to enroll in vocational agriculture. It is also important that these students learn of their educational and career opportunities in agriculture while enrolled in the secondary program.

Students at the secondary level must have the opportunity to explore the different areas of agricultural mechanization--power and machinery, structures and environment, construction and maintenance, soil and water mechanics, and electric power and processing. In order for students to learn needed understandings, skills and abilities, the secondary program should include a balance of classroom activities, laboratory or required activities and approved project activities. Curricula at the secondary level is most often determined by the preparation & experience of the instructor. While pursuing the bachelor of science degree, most vocational agriculture instructors did not obtain an adequate educational background in all areas of agricultural mechanization. This deficiency should be eliminated through participation in graduate level in-service educational programs provided.

Throughout the instructional program at the secondary level, students should obtain basic competencies in decision making and quantitative problem solving, communicative skills, record keeping and "housekeeping".

A positive attitude towards safety and work are other important considerations in the development of secondary school programs in agricultural mechanization.

Due to the need for secondary students to have the opportunity to explore the five areas of agricultural mechanization; to develop basic understandings, skills and abilities in agricultural mechanization, problem solving and communications; and to develop positive attitudes--the amount of time devoted to agricultural mechanization instruction at the secondary level should be increased.

CURRICULUM IN THE SECONDARY SCHOOL

WHAT SHOULD THE AG MECHANICS CURRICULUM AT THE SECONDARY SCHOOL INCLUDE

Dale A. Drees

Reaction to remarks made by Ed Breece

Dale A. Drees
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I. All secondary schools must teach the 3 R's.
   A. Reading, Writing and Arithmetic should be included in each unit on all levels of instruction.

II. The names and types of machinery used in the area should be identified and understood.
   A. The location of the educational facilities makes a difference. (Example: In northern Minnesota Ag Mechanics deal with forest and logging equipment, while in southern Minnesota, crop production equipment should be stressed).

III. The instructional program should help students understand the operator's manuals and develop the ability to operate machinery safely.
   A. Students come from a wide background, some have never operated any machinery.
   B. Skills to start and stop the machinery is essential to safety. Too often people come across a farm accident, but don't know how to stop the machine.

IV. Students should be able to service, adjust, maintain, complete minor repairs and complete all necessary records.
   A. Adjustments such as calibration, application rates, harvest loss, tileage depth and tune-ups are examples of skills which should be developed.
   B. Good record-keeping will help make the operator more aware of maintenance intervals, thus reducing down time and warranty claims.
   C. Welding skills using D.C. reverse polarity and high tensile strength electrodes for the repair of high carbon steels is needed.

V. An understanding of how to operate the computer and to use the software materials that are available.
   A. The need for keyboarding skills is essential and important for operation of the computer.
   B. A basic knowledge of computer language and operation should be stressed.

VI. An understanding of the parts of equipment and the functions they perform is essential to trouble shooting problems.
   A. Complete small engine repair including overhaul should be stressed.
   B. Tear down and re-assembly of large engines to help develop an understanding of the parts is also important, however, overhaul should be left for post secondary schools.

VII. Counciling and discussion of future plans for each student must also be included in the secondary curriculum.
   A. The job opportunities in farm equipment mechanic/technician should be identified.
   B. The educational facilities that are available to the students after high school should be identified.
   C. The development of personal qualities needed to obtain, maintain and advance in the ag mechanics field should be obtained through FFA contests.

VIII. Survey the community and evaluate the program each year.
- A. Through the use of advisory committees, the ag mechanics skills students need and the machinery used in the area can be identified.
- B. Each year the curriculum needs to be evaluated and improved.
- C. Above all - keep an open mind to suggestions as the field changes quickly.

CURRICULA -- GOALS AND PROBLEMS

WHAT KNOWLEDGE AND SKILLS SHOULD SECONDARY SCHOOL STUDENTS DEVELOP?

RICHARD E. LINHARDT

Richard E. Linhardt
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Secondary school agricultural mechanics should develop knowledge and skills that prepare for:

Job Entry
Area School
Junior College
4-Year College and University

With this in mind there are certain basic skills that are taught during the first two years that should be taught regardless of career choice. Some of these are metal and wood working, welding, threading, maintenance, service and adjustment, etc.

Students should have a knowledge and appreciation for tools -- their proper use and care.

A student should develop work habits and safety habits. In addition a student should have a knowledge of careers so they can make an intelligent career choice.

In addition to all of these skills, it is important that students develop certain leadership skills.

In final analysis it was agreed that a student should have specific problem solving skills that will grow out of his learning the basics. This will be invaluable to whatever his career choice might be.

CURRICULA IN THE SECONDARY SCHOOL

WHAT KNOWLEDGE AND SKILLS SHOULD SECONDARY SCHOOL STUDENTS DEVELOP?

Jim Guilinger

Reaction to remarks made by Richard Lindhardt

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I agree with the major concepts discussed by the WS Group 3 and presented to the conference.

It is imparative that the basic skills and competencies be developed with secondary students to provide a solid base for further education.

The following points should be reinforced or added:

1. Teach basic ag mechanics at the secondary level.
2. Minipulative skills and identification of tools and equipment needs to be developed at this stage of education.
3. Development of academic skills (math, science, communication, that can be transferred into useage at the ag mechanic technition level. (Fractions transferred to wrench sizes).
4. Hands-on instruction in small engines, identification of parts, the operation process of specific mechanical parts in machinery and equipment, as well as the service and maintenance of farm equipment.
5. Develop positive attitudes in ag mechanics, the value of good work ethics and productivity on the part of the students.
6. Use of cooperative education in ag mechanics sites for junior and senior students, thereby improving the student's knowledge for entry to a community college program.
7. Articulation between secondary, community college instructors and industry representatives to aid in determining the skills needed at each level for instructors to teach.
8. Secondary agriculture instructors need upgrading at regular intervals probably through the community college level over the four year university approach due to travel distance and other factors.
9. Industry has referred to technition training, but implied that they need trained people in bookkeeping and other areas which may have to be their responsibility for upgrading similar to their current training programs.
10. Development of computer usage will be needed as the electronic age advances into ag mechanics and the industry.

What Are The Major Problems Associated With The Secondary School Ag Mech Program?

JACK BAILIFF

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Our group discussed a subject that seems to be a concern in many areas and that being the emphasis of general education. Math usually heads the list, including algebra and some physics. Reading and understanding what is read are also important. Methodology of problem solving should also be listed as a needed subject to help the student. Science should compliment the physics course.

Sincerity of the student in his/her selected field cannot be taken lightly. The chosen trade should be viewed as a lifelong endeavor to be utilized to its fullest potential. It must be recognized that this is difficult for young people who must make a decision that will affect them the rest of their working career.

On the job training could help in determining what job career the student could excel in. The student should be encouraged to review the chosen career and to change careers if necessary to be productive.

Counselors must consider the advice given students as tremendously important as this directly affects a person's life. At times it appears that counselors become too involved in academic courses; they should familiarize themselves more in the vocational fields to better advise the students. The vocational schools could help the counselors with this matter.

The high school vocational and Ag teachers need to seek some conformity of the type and depth of instruction available. Some of the problems are a lack of expertise or too much expertise. The needs suggested were:

Basic mechanics instruction
Basic maintenance
An understanding of systems: electrical, hydraulics, engines, parts identification

Also, should not concentrate too much on one subject, such as speed of disassembly or small engines.

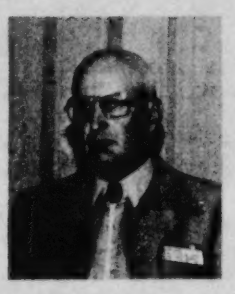
Part of the blame rests with the university in training the vocational and Ag instructors in that the instructors can be loaded with too many academic courses when possibly some of this time could be better spent in vocational subjects that would benefit the instructors in the high school courses taught.

We must point out that the high schools need financial support to provide the vocational Ag instructors with equipment and facilities to properly train their students.

Many pertinent concerns were discussed in our group and most were not new. Now that they have been aired to one and all, let's not sit back and complain; but let's move instead to correct the problems and provide the needed product.

What are the major problems associated with the secondary school ag mech programs

Don Ward
Jack Bailiff



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One of the major problems in secondary Ag mechanics is time. In most cases they do not have more than enough time to teach basics.

Another major problem is that counslers tend to send poorer students in to ag mechanics. The facilities, equipment and teaching aids are not generally available for the secondary programs to train technications.

It should be the responsibility of secondary teachers to develop the high achiever and see that they pursue a career in Ag Mechanics. They also need to help students develop a positive attitude toward their work and that it is a progressive field.

The Vo-Ag teachers do an excellent job in selecting and sending students to the area post secondary programs.

Another area that helps get good students are the ag business and VOE programs.

In most cases the secondary teacher is not qualified to teach technical skills that a techniction would need for gainful employment. Many programs are geared mainly to construction and not toward machinery repair. Secondary teachers need to have information available from industry to teach basic skills and basic service and safety.

Universities and Community Colleges also need to develop training programs and up date the secondary teachers.

It should be the responsibility of the teacher to let the colleges and industry know what their needs are.

CURRICULA - GOALS AND PROBLEMS

How can industry and the secondary school cooperate to correct problems so that the results are beneficial to all--the secondary school, industry and the students?

William G. Hires

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How can industry and the secondary school cooperate to correct problems so that the results are beneficial to all--the secondary school, industry and student?

One of the first things to do when discussing this question is to identify secondary school agricultural mechanization courses. Vocational agriculture is made up of all areas of agricultural mechanics, while secondary vocational technical schools select one area for juniors and seniors with a large majority studying the farm power and machinery area. Larry Munton asked the question why don't we define what we are doing on the secondary and post-secondary level? Time did not allow us to do this.

It was stated that Vo Ag should teach maintenance and theory while Ag Power and Machinery courses would teach an excellent cross-section of farm machinery. Both courses would make extensive use of FOS and FMO texts.

It was agreed that strong functioning advisory committees with farm machinery dealers serving as active members would greatly benefit vocational agricultural instructors and agricultural instructors and agricultural power and machinery instructors. Advice from the advisory committee should be used by the instructor in numerous ways. In most cases this advice would be directed to the vocational school director, principal and school superintendent.

Industry through their dealers should encourage and help secondary instructors attend schools. In some cases high school students should be included in these schools.

Industry and local dealers should take strong positions of leadership in areas of educational needs on local, state and national areas. This would include numerous areas such as funding, course content, boards of education, etc.

Further discussion included an aptitude test or tests or some other type of mechanism developed with industry leadership identifying students that will be successful agricultural power and machinery students and professionals.

Another area we discussed was the need for industry help in working with universities teaching in-service courses with credit being applied for a BS or MS degree.

Other help should be included in developing teaching aids, course content, tests and any area seen to need strengthening.

This report is not being used to indicate that industry and farm machinery dealers have not been a great help to education because they have. Cooperation among the students, educators and industry will continue to turn out excellent students for agricultural mechanization.

CURRICULA IN THE SECONDARY SCHOOL

How can industry and the secondary schools cooperate to correct the defined problems so that the results are beneficial to all - the secondary school, industry and students?

Timothy J. Claus

Reaction to remarks made by Richard Loberger

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In response to the discussion on how industry and secondary schools can cooperate to correct the problems defined, I have the following comments.

Forming and using an advisory committee of local agricultural business men to help direct and guide the Secondary Agricultural Mechanization Course is an excellent idea. They could help to guide the emphasis of the course and offer expertise in areas the instructor may not have to provide solutions to some of the other stated problems.

The suggestion that a nation-wide aptitude test should be developed in cooperation with industry is another suggestion which merits additional discussion. Proficiency level guidelines for each level of educational advancement are currently being developed and both education and industry should continue to push for this.

Not suggested as a possible solution, but I believe should be, is that an increased effort should be made to develop, upgrade, and enhance the public image of the modern service technician. This will attract the high achiever at the secondary level into an Agricultural Mechanization program, so he can be trained and developed into that modern service technician.

Some ways to accomplish this image improvement are through field trips to dealerships, sales branches, and factories. We could also offer achievement awards and have more frequent involvement and visits by territory representatives to secondary schools. Efforts to familiarize career counselors with Agricultural Mechanization programs and the future of a trained agricultural service technicians should be increased.

CURRICULA -- GOALS AND PROBLEMS

RESPONSE TO TOPIC BY REACTOR CHAIRMAN

FORREST BEAR

Forrest Bear
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The problem with our educational system and business world is that it needs a change in attitudes. Too many people want to be "Chiefs" and no one wants to be an "Indian." Our assignment of status in the social structure is out of balance. High schools want to promote easy courses and don't frustrate the student curriculums. Vocational Technical Institutes, community colleges, technical colleges and similar institutions all want to become universities. What's wrong with finding your niche in life and doing the best possible job and quit blaming everyone else for the educational problems? Maybe the problem isn't subject matter but it's people. Stop playing politics and decide what's right, instead of who's right.

Let's teach youth and develop a product with the correct attitude. Develop such traits as honesty, pride of workmanship, social acceptability, acceptance of responsibility, work habits and that your word is your bond. That a handshake is more binding than a seven-page legal document. As this occurs, the basics of ability to read, write, speak and calculate will have meaning because the need will become evident. We have the bricks and mortar, the hardware and software, the audio visual and magnetic media, but we don't have the qualified operators. First, the American people must support the schools, business and industry. If parents are sending youth to school who aren't socially adjusted, don't want to learn, etc., then its time to support the schools and industry and help them rear and educate the youth. There is not a single weak link in the educational chain. All the links have dwindled in size and want to place the responsibility elsewhere.

It doesn't matter what subject matter is in the curriculum. We need a nationwide attitude adjustment from the corporations to the small family business and from the university to the preschool program. When we have concerned people teaching people and working people with pride of workmanship and willingness to be the "best," we will discover that our curriculum problems have been solved.

What Should the Ag Mech Curriculum in the Post-Secondary School Include?

William B. Schreck

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The specific curriculum of the post-secondary agricultural mechanics program must be developed by agriculture educators with direct involvement of agricultural equipment personnel at all levels through a bona fide advisory committee. The program must strongly encourage a solid foundation in the basic skills and an understanding of machinery and equipment operation.

The curriculum should include units of instruction in the basic mechanical skills common to all agricultural mechanics operations. Basic agricultural mechanics skills should include, but not be limited to: theory and fundamentals of operation; adjustment techniques; and predelivery tasks. Activities to develop technical skills in equipment diagnosis, as well as, techniques for repair procedures is essential to the total program.

In addition to the development of mechanical skills and techniques, it is important to address the work techniques of the student. The agricultural mechanics curriculum should include extensive instruction in identification and proper use of tools of the trade with attention given to specialty tools. The student must learn techniques in housekeeping and develop safe work habits.

Finally, the curriculum must address personal development of the student to provide a well-rounded education and insure occupational success. The group identified proper attitude as the number one personal characteristic necessary for achieving success. Other areas in which personal skill development is important included: human relations, leadership, and communications. Management skills are important not only for recordkeeping, but for accountability and time management, and to insure continued success in the field of ag mechanization, the student must be able to develop a program for continued education utilizing formal courses, inservice workshops, self-instruction, etc.

The previously mentioned components must be identified and incorporated into the ag mechanics curriculum in order to provide the student with skills necessary to achieve success in the field of ag mechanization.

CURRICULA IN THE POST-SECONDARY SCHOOL

What Should the Ag Mech Curriculum in the Post-Secondary School Include?

Marvin Case

Remarks Made by William Shreck

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Curriculum for Ag Mech courses should be a balance between the dealership and student needs. Course offerings should be with the approval of a local advisory board.

Course curriculum should provide the student with a competent background in the basics of Ag Mechanics.

These basics should include the setting up and pre-delivery servicing of new machines. The ability to operate and demonstrate the machine, and the ability to service, repair or recondition the various units that might be found on the machine or power unit.

Basic courses should include the areas of hydraulics and electrical systems. Competent skills will be needed in communications, math, manual interpretations, and welding.

The student should receive training in field adjustments and in field service calls. The student should be exposed to the dealers service procedures and operations early in his study.

Later in his studies the student should receive on the job training.

Areas that will have to be stressed in the future are:

a. Math - the ability to convert units of metric to units of the English system or units of English to metrics.

b. Computers - the ability to operate a computer as a source of technical information in diagnosing, adjusting, and servicing of equipment he is working on.

In conclusion, source curriculum should cover current machine biases, however, earlier system basics may have to be included as at times new systems are built upon some of the earlier principles that may not be presented in present material. The student should be able to test out of areas that he is competent in.

CURRICULA - GOALS AND PROBLEMS

WHAT KNOWLEDGE AND SKILLS SHOULD POST SECONDARY STUDENTS DEVELOP?

William L. Ryden

William L. Ryden
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The knowledge and skills that should be developed at the post secondary level was discussed from a wide range of views. Our group consisted of educators and industry people from a number of states representing Vocational Technical Institutes, Community Colleges, Land Grant Colleges and industry. The philosophies differed considerably as the purpose and goals of the various institutions were not uniform. For example: The vocational technical institute offering a two-year program would have a different list of requirements than a four-year college program.

We decided that the important knowledge and skills should be divided into three basic areas as follows:

1) BASIC UNDERSTANDING OF MECHANICAL SYSTEMS

Hydraulic Systems
Power Trains
Air Conditioning
Electrical Systems
Engines Gasoline and Diesel
Computer Background
Starters and Alternators
Valve Adjustments
Shop Tools
Welding
Many others of lesser importance

2) GENERAL MECHANICAL AND ANALYTICAL KNOWLEDGE AND SKILLS

Machine Operating Skills
Equipment Adjustment and Setup
Understanding of parts and the location on machines
Preventive Maintenance
Understanding how to use manuals
Diagnostic Skills and Procedures

3) INTERPERSONAL KNOWLEDGE AND SKILLS

These areas are normally taught along with specific areas itemized above and represent areas necessary to the overall development of post secondary students.

Communication Skills
Work Habits -
- Responsibility
- Leadership
- Productivity
- Attitude

Safety
Logic and Common Sense

The knowledge and skill areas listed above represent the most important and would probably be included in the curriculum of all institutions. The main difference between the various educational levels would be the length of time and depth of study in these skills.

Curricula in the Post-Secondary School

What knowledge and skills should post-secondary students develop

Harold M. Gates

Reaction to remarks made by William Ryden

Harold M. Gates
Ag. Mechanics Instructor
Kishwaukee College
Malta, IL. 60150

1. Safety and work habits to prepare students for industry:

First, the student shall learn to be well organized. His or her tool box and tools shall be arranged so that the student knows where all the tools are in order to minimize time spent on the job being performed. Also, the student shall learn to go to the manuals to determine the proper procedures for the job to be accomplished. From these, he or she can obtain proper dismantling and re-assembly procedures, and at the same time secure all the specifications and values. Knowledge beforehand is a prerequisite!

Housekeeping is another area to be accomplished while attending school, especially in laboratory sessions. Students are instructed on cleanliness of tools, equipment being worked on, and area around equipment. They must store neatly all parts removed from the project. At the end of the session, they must clean the floors, wipe up all oil spillage, as oil is a safety hazard. An organized, clean technician reflects on the quality of work done in the eyes of the customer. All of the above mentioned go hand in hand with safety.

Students must learn the proper use of jacks and hoists and also how to use jack stands under equipment so it is safe to work around.

2. Being able to understand instructions or directions given:

Verbal instructions - The student shall have good listening ability. Written instructions such as in technical manuals - Student shall be able to read and comprehend from manual what is to be done, along with specifications to be used.

We are fortunate at our college to have our students learn English from a very competent instructor. Reading skills and word definition are taught in this class. Students also learn inter-personal relationship skills, which are a "must" in relating to customers, service managers, and parts persons, and are helpful all through life. Writing legibility, correct grammar, punctuation, etc., are stressed. Students also learn to prepare their resumes in this class, which is mandatory for graduation from the A.A.S. program and is taught during their freshman year.

3. Special Tools:

The proper use of special tools cannot be stressed enough. We have specifications and measurements given us to return the unit to standard measurements. In the special tools class, the students attain competency in the proper use and care of micrometers, torque wrenches, cylinder bore gauges, pin hones, valve grinders, valve refacers, and magnaflux equipment. They also attain competency in electrical test equipment use, such as voltage and ampmeters, ohm meters, and diode testers. This special class on tools is a requisite, and we teach it along with the students' Basic Engine Overhaul Class.

4. Skills Improvement Evaluation:

If you have an S.O.E. or O.J.T. program, you may use the competency sheet from this to evaluate your student as he progresses through lecture and lab sessions. State firmly in your syllabus what you expect of the student.

To evaluate your own program, use the Employer Report in the S.O.E. Manual. If your student is lacking in some area, it will show on his report. Then ask yourself if the student was given proper instruction in this area and enough lab time to gain skills. Another good source of information regarding your program is your Advisory Committee. The members are close to you, know your program, and will give you definite and firm answers. Use this resource to the fullest extent.

While in lab sessions, teach students the proper ways of diagnosing the problem or troubleshooting. A good technician is one who will take the proper steps to diagnose and then repair the problem. Have them think, use their

eyes, and then start repair after diagnosis.

5. Pride:

Last, but not least, I have heard the word "pride" mentioned only one time at this conference by Dave Jones. A good technician will take pride in the finished product. In my thinking, no pride means a sloppy technician and finished job on the unit.

We as instructors can instill pride in our students from the first day of class onward. Let us all take pride in the presentations of materials in the classroom, of materials selected, and in our facilities, equipment, and labs. The student soon forms work habits from instructors, and pride will soon be a part of his personality that he will carry throughout his life no matter what he endeavors to do.

If we can do this, we will not only have a better technician but also a better building block for our society.

Curricula - Goals and Problems

What are the Major Problems Associated with the Postsecondary Ag Mech Programs?

Allen Linster

(A report of Ronald Anderson's workshop group)

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Agriculture Mechanics instruction does encounter a number of problems in providing quality education for its students. The workshop gave us an opportunity to identify some of them as the first step in finding solutions. The most encouraging development was that for every problem identified, there was a workshop member who had a solution for it. It was evident that through communication with all involved, the major problems can be overcome.

Ten problem areas were identified. The first one dealt with how to find time in the curriculum to provide all the training needed to graduate a quality technician. Schools have to face the problem of determining what to eliminate or reduce so new areas can be added.

The second problem was how to provide the necessary "hands-on" training and yet provide the theory for problem solving and to cope with continuing education.

The third was, how can schools secure the right equipment when they need it to provide experience on line equipment? When a school does work on others' equipment, how do they cope with poor quality work by the students and what is their liability for work on others' equipment?

Another problem was how to obtain, pay for and charge for needed parts and get them in a timely fashion.

A fifth problem concerned preparing students for work in a dealership where shortcuts are taken and manufacturer's procedures are not always followed.

A problem in recruiting good students is the poor image many have of the ag mechanics. There appears to be a lack of knowledge about the skills required to service today's farm equipment by the general public and high school students.

Another problem associated with recruitment and placement of graduates is the low salaries paid for Ag Mechanics. The industry needs to look at ways to upgrade the Ag Mechanic and/or provide information on salary comparisons with other mechanics.

There is a lack of uniformity in length of programs, titles and curriculum between schools and states. There needs to be some local flexibility but training needs do not change at the state lines.

Local schools and state departments must do the necessary research to determine the number and type of each program needed. Duplication should be avoided and individual school's investment in facilities and equipment should be utilized fully before new programs are started.

The last problem concerned using the instructors' time to best advantage. Question was raised as to how much time should an instructor spend in obtaining parts, equipment and doing shop maintenance?

CURRICULA IN THE POST-SECONDARY SCHOOL

What should the Ag mech curriculum in the post-secondary school include?

Francis (Bud) Hethcote

Reaction to remarks made by Ronald Anderson

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Time is one of our greatest problems in our Ag-Mechanization programs today. Some programs have been shortened because of student interests, drop-outs, and economics. Many students do not want to go to school for a long period of time. Many can not afford more than one year. An answer to this may be a longer day, such as eight hours instead of six. Which would cost them but a small amount more than it does now. But it could add twenty-five percent to the knowledge and experience they could take with them.

One problem with an eight hour day is the Instructor load. A program with but one instructor would have a great overload. I doubt that the extra tuition and such would pay the extra instructor. So you might have a funding problem. Which is also a problem for Ag-Mechanization programs.

I am sure that any instructor with any extra time could prepare better lesson plans and make more and better teaching aids.

Time for instructor updating in many programs is very short. When an instructor attends a factory school, students are either dismissed or they have a substitute which mostly babysits with them. Timing of summer schools put on by factories would be very hard to time to fit a larger percentage of instructors.

When the Ag-Mechanizations programs were started in Iowa in 1966, it was decided to teach the basics. That is all we are teaching today but due to the change in Ag machines, there are more basics. Air conditioning was not considered necessary at that time. Electronic monitoring systems are definitely with us at this time. It is believed by many that mini computers will be controlling many of the functions of our machines in the near future. Now we are talking about some basic electronics and basic computers.

We need more time for them to learn the original basics better and where do we find the time to teach these new ones today and the ones we don't know about that will be here tomarrow.

Time is a problem and with this always goes a problem of funding.

CURRICULA IN THE POST-SECONDARY SCHOOL

How can industry and the post secondary schools cooperate to correct defined problems so that the results are beneficial to the community, school, industry and the students?

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I. We identified several problems and suggested several solutions to each. The first problem we addressed was that of recruitment of post secondary students. It appears this is a real problem in states which have an "open door policy". That is, the first to enroll get to take the course. This results in having poor caliber students and also "shuts the door" on students who should be enrolled in the course. Possible solutions to prevent enrollment of poor caliber students would be as follows:

1. Use of dealers and/or dealer associations for recommendations of potential students.
2. Set up entry criteria as the use of the pre-entry test.
3. Use of an interview requirement by the instructor of the program.
4. Use of aptitude tests. These tests will identify students who have mechanical aptitude and appreciation.

II. Another area of concern was that of communication. This needs more emphasis and should be identified by dealers and/or company service representatives.

Not all major manufacturing companies cooperate at the same level with post secondary instructors. It appears that most all have programs available in providing materials, equipment, resource personnel and conduct service schools but utilization of these programs are not universal.

A big problem is that of awareness of the programs. A possible solution would be an organization of all state agricultural mechanization instructors so an exchange of ideas may exist. If future seminars of this type exists, perhaps scheduling a time for a "change of ideas" would be helpful; especially between states.

III. Problems also were identified with on-the-job training stations. Economics and distances to dealerships were identified. A possible solution would be to include more dealers on advisory councils. It is important that advisory council members terms be limited in order to insure new members are on the council.

IV. Other problems identified were that of the availability of equipment for current technology, retraining programs in post secondary schools and resource people availability.

CURRICULA IN THE POSTSECONDARY SCHOOL

How can industry and the postsecondary schools cooperate to correct defined problems so that the results are beneficial to the community-school, industry and students in Ag. Mech.?

Harold Stogsdill

Reaction to remarks by Richard Loberger

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The question was posed earlier, "Are we a part of the problem or do we have a solution?" I guess I'm a part of the problem- - -so if I go home now you will have the solution. Seriously, I see five broad areas of cooperation between industry (both dealers and manufacturers) education and students that I feel would be beneficial to all concerned.

First, there must be mutual honesty. Mr. Dealer, what do you really want and are willing to pay for in a technician? Would you rather have a technician that can "beat" flat rate by 30% and have a 10% comeback or one that works at 125% flat rate with a 1% comeback? Do you really want a diesel technician or a "robotic" parts changer?

Mr. Educator, let's not get carried away with "creative financing" and peddle our low cost or donated training aids "out the back door". I feel industry has generally been most generous so let's return the favor by using this material as it was intended. Also, let's not misrepresent the product we are turning out. Heavens knows few of us can take an unmotivated, non-reading individual with poor manipulative skills and from this, mass produce skilled technicians.

It has been said "Ask and ye shall receive." Yes, we must improve our communications. As teachers we need to ask for help in specific areas---and then be prepared to respond when it is offered. I'm sure we can provide workshops, seminars, physical facilities and teaching skill to industry, particularily the local dealers, if they will make their needs known.

Next we must be realistic in our expectations of ourselves and of each other. The dealer must recognize that a two year VoTech program (some 800 or 900 hours of technical instruction) can never replace all of the knowledge and experience gained from 20 years of good work experience. I'd like to ask you dealers to look at the college transcript of a prospective employee. Most colleges give letter grades for courses completed. Imperfect as our grading system may be, it is an indication of our evaluation of a student's performance. An A is usually better than a D. As educators we must realize that industry can only contribute so much. I'm afraid we have to forget the "I'll take one of each" attitude. In the past our students have not been the most academically talented. I accept this as a challenge---not a problem and I think our success in the past speaks for itself. The student must reconize that an Agr. Power and Machinery technician is more than the glorified hydraulic specialist, computer technician or diesel technician. Replacing straw walkers in a combine on a 100° July day or repairing a broken combine axle in mud and water when the wind chill is about 0° isn't nearly as glamorous as being a "diesel mechanic." The student must also remember you don't start at the top and work up.

The fourth area of concern is guidance. What should our program cover? What is the proper balance between theory and practice? A few years ago we were encouraged to get deeply involved teaching diesel fuel systems. Yes, even to rebuilding and calibrating pumps. Today very few dealers do this type of work. Are computers and microprocessors the fad of today that will be gone tomorrow?

Finally, the fifth area and somewhat a review of the previous four is to encourage closer cooperation in our training efforts. Schools could offer our educational facilities and teaching expertise to industry. Industry and dealers could offer their facilities and experience to post secondary teachers. I feel it would be beneficial to make greater use of peer groups and local facilities. I strongly urged the expanded use of statewide Ag. Mechanics Advisory Committees and local advisory committees to facilitate the kind of cooperation between industry and education that will be beneficial to the community.

CURRICULA IN THE POSTSECONDARY SCHOOL

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What should the curriculum in the post-secondary system include?

The curriculum in post-secondary ag mechanization programs should provide for student comprehension in the basics of the following areas:

1. DC Electricity
2. Hydraulics
3. Engines
4. Fuel Systems
5. Power Transfer Systems
6. Reconditioning & Repair (welding, sheet metal fiberglassing)
7. Communications
8. Human Relations
9. Shop Facilities (AC electricity, plumbing, carpentry)

It should also provide experience working on live equipment (tractors, combines, planters). This last part is especially necessary to provide the student with sufficient skills to enable him (her) to be of value to the employer without first having to serve a long-time apprenticeship in the dealership.

Assembly & handling of machinery while a necessary part of ag mechanization, needs to be a separate program of shorter duration than that of the line mechanic. Recruitment of students into this area of ag mechanization is a problem as it is perceived by prospective students as a lower class of mechanics without demand or reward.

Ag mechanization in the post-secondary school should also provide instruction for the farm or agribusiness bound student. Maintenance, safety, minor repair and management should be the thrust of this facet of the program.

All students in ag mechanization should have an understanding and appreciation of the workings and practices of the farm equipment dealership. They need to know how they fit into the overall scheme whether mechanic, salesman, parts man or customer.

What are the major problems associated with the post-secondary ag mechanization program?

There are three major problems associated with post-secondary ag mechanization problems as I see it. They are lack of funding, getting good instructors and requiring too many general studies courses in the curriculum.

Lack of funding is not a problem of ag mechanization alone. This problem is shared with all vocational programs at the post-secondary level. What makes ag mechanization so vunerable is the high initial cost and maintenance of the necessary equipment needed to teach the basic fundamentals and skills when paired to the number of students using said equipment. This is where the industry can most help the program. Used components provided by the dealership and warranty items provided by the parent company can really help hold down overall costs so that available school funds can be used to provide tools and test equipment.

Getting good instructors, dedicated to serving students is exceedingly difficult. Being an outstanding mechanic does not necessarily mean you will be an outstanding teacher and conversely an outstanding teacher without technical skills is worthless. I would personally prefer to take a technically competent mechanic and attempt to make a teacher out of him than try to make a mechanic out of a teacher. It just takes too long for a technically deficient person to become proficient in all the many skills the mechanic must possess.

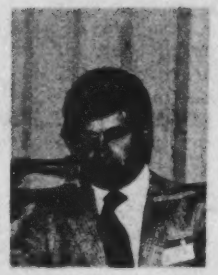
I have found, as a general rule, that instructors coming out of industry are more likely to have and be able to pass on to students the work habits necessary to make the student a success in the field.

The trend today seems to be toward a more general type of education for vocational technical students. This, I feel, is not good for the student or his potential employer unless it is done by expanding the length of the program. It is pushing things at present to get across the basics and provide the needed skills in the time now allocated to the program. Any move to cut down this time period can only result in graduates not ready to become productive employees.

CURRICULA IN THE UNIVERSITY

What should the Ag Mech curriculum at the University include?

Victor Bekkum



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Before answering the question, the workshop group discussed and discribed the university ag mechanics program. The university ag mechanization curriculum is broader based than the post-secondary program. On the input side, students take courses in many additional areas other than power and machinery common to many postsecondary programs. On the output side, graduates have employment opportunities in the many areas of agri-business, industry and education.

The ag mechanization curriculum at the university includes courses in four technical areas of agriculture. In addition to ag mechanics, courses required should include the areas of animal science, agronomy and agricultural economics. The ag mechanics courses should include the five major areas of power and machinery, structures and environment, soil and water, electrical power and processing, and construction and maintenance. Opportunities to emphasize one or more areas in ag mechanics will allow specialization if the student desires. Another approach to specialization is the option program. The option program allows the student to enroll in specific areas of mechanization such as business, service or ag production.

In addition to the technical areas of agriculture, courses should be offered in communications including writing and speaking, public relations, mathematics, the social, physical and biological sciences and humanities.

Active participation by students in an organization of agricultural mechanization can provide opportunities for leadership development. The students can develop programs of special interest and recognition to supplement the classwork.

CURRICULA IN THE UNIVERSITY

What should the Agricultural Mechanization Curriculum at the University include?

PAUL AAKRE

Reaction to remarks made by Victor Bekkum

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The Agricultural Mechanization curricula at the University level should be a broad program, stated Victor Bekkum. This program should encompass areas of power and machinery, soil and water, electrical power and processing, structures and environment, food engineering and the construction and maintenance areas.

A college bulletin from one of our upper midwestern land grant colleges states, "The curriculum in Agricultural Mechanization provides training in the application of mechanical principles to Agricultural Production, Processing and Business. It is a broad program in the Agricultural Sciences and Farm Mechanization."

The intent of the University Agricultural Mechanization program is not to train students as proficient technicians. However, the program should include training in the basic skills area as required of technical graduates. Agricultural Mechanization graduates often work with well-trained technicians in career areas of sales and service. The University graduate must recognize the technician's expertise and respect his abilities. Often the University graduate will have technicians working under his supervision. Curricula at the University should include training in business and labor management, human relations, communication and report writing. The University Agricultural Mechanization program must have a compatible combination of theory as well as practical training. Occasionally, students who start in Agricultural Mechanization programs transfer over to Agricultural Engineering. More commonly, however, students graduate from the program to enter the employment areas of sales, service, research and farming.

Agricultural Education students use Agricultural Mechanization programs in their curriculum. These students need practical, useful application, not heavy, theory related courses. Some University programs also offer a two year degree program. The Agricultural Mechanization curriculum should be flexible to provide these students useful training in two years.

University Mechanized Agriculture programs prepare students for a broad area of Agricultural Mechanization. Most graduates will be working with people and, in many cases, involved with business management. It is imperative that the needs for the basic agricultural mechanics skills and knowledge remain, but, at the same time, the need for communication ability, human relations skills, and business management are essential.

WHAT KNOWLEDGE AND SKILLS IN AGRICULTURAL MECHANICS SHOULD UNIVERSITY STUDENTS DEVELOP?

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Four year Agricultural Mechanics programs require that students attain knowledge and skills which range from mechanical to management as well as the abilities to understand basic design parameters. This is necessary because individuals from these programs most commonly enter industry in technical service, sales or management training positions. Most Agricultural Mechanics programs are general in nature; that is, they prepare students for entry into any one of the five technical areas recognized by the American Society of Agricultural Engineering.

The basic sciences are the foundation of the knowledge and skills which 4 year Agricultural Mechanics students must develop. This foundation must be complimented by a general education which stresses excellent communication and interpersonal skills. This combination will provide an excellent 4 year Agricultural Mechanics graduate with abilities to break complex problems down, so that they may be systematically resolved. A problem solving method must be considered the most important skill developed by the 4 year Agricultural Mechanics graduate.

Although we recognize the 4 year Agricultural Mechanics program as preparing individuals in all five technical areas, this conference is directed mainly to Power and Machinery. With this in mind, we suggest that mechanical skills in engine overhaul, mechanical power transmission, hydraulics, and electrical systems are absolutely necessary. We do not suggest that these graduates have highly refined mechanical skills, that is the ability to work at "flat-rate" speeds, but rather that they acquire broad base exposure to mechanical problems and their solutions. Back-up courses of drafting and basic mechanical design should also be considered of extreme importance.

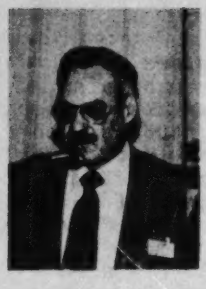
The advent of the computer and electronics has added a new area which the 4 year Agricultural Mechanics graduate must master. These graduates must have an understanding of "What's in the Black Box" and how it can be applied to the sensing and control of mechanical systems. Skills in basic programming are necessary for the 4 year Agricultural Mechanics graduate to insure their ability to understand the logic behind the operation of electronic systems.

The 4 year Agricultural Mechanics graduate is not a mechanic or design engineer, but rather, an intermediate link between the two. This intermediate link should be prepared with the basic qualities of both the good mechanic and engineer.

Reactor to "What Knowledge and Skills in Ag Mech Should University Students Develop?"

Harry J. Hoerner

Reaction to remarks made by Jerry Nechville



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Because of the prospects of employment in the general agricultural mechanization fields, across the board, the universities must, and for the most do, offer educational units reflective of the recognized subject matter of ASAE in the following areas, namely:

1) Power and Machinery
2) Structures and Environment
3) Electric Power and Processing
4) Soil and Water Mechanics
5) Food Processing, and
6) Construction and Maintenance.

Taking one example, namely Structures and Environment, skills and understandings in related courses include:

1) Farmstead layout and planning
2) Systems, animal heating, cooling, lighting, animal movement, waste disposal and material handling (From this will come specific skills and understandings in electrical wiring loads, use of the psychrometric charts, fan design and bacterial action in lagoons, just to name a few
3) General building construction including carpentry and masonry skills; and
4) Safety and occupational hazards related to this subject matter units.

Other skills, not necessarily the sole responsibility of the ag mech-section, encompassing the university and the other disciplines in agriculture totally:

1) Mathematics, basic sciences and problem solving activities, skills and understandings.
2) Publicity and human relationships skills.
3) Leadership skills.
4) Salemanship skills.
5) Quanitative and informational sciences (word processing and computers).
6) Field studies and internships - hands-on experiences in ag mech and other agricultural businesses.
7) Practicums for those lacking general agricultural knowledges, especially those from non-farm settings, and
8) Broad array of other agricultural knowledge and skills in the non-ag mech areas including the animal sciences, agronomic sciences, and the business and management agricultural sciences.

Net-Result: A well-rounded, well trained professional in Ag. Mechanics with the ability to work in numerous mechanization and general agriculture fields.

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What are the problems associated with the University Agricultural Mechanization Program?

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Before discussing problems with the University Agricultural Mechanization programs, Agricultural Mechanization should first be defined. Agricultural Mechanization is a broad curriculum that provides training in the application of mechanical principles in power and machinery, soil and water, electrical power and processing, structures and environment, food engineering, and the construction and maintenance areas. Courses in communications, mathematics, the sciences, business, and agriculture are also included in the curriculum.

Many four year and two year Agricultural Mechanization programs have different options for students to choose. Agribusiness options are designed for students who wish to work in a business related to one of the Ag Mech areas. A farm production option is designed for those who want to pursue farming or ranching as a career. There are also two year University technical programs in Ag Mech that allow students to specialize in a particular area, such as power and machinery. When discussing the problems associated with University Ag Mech programs, one must be aware that programs differ from state to state and even within a state. This implies that each program may have unique problems.

Problems within University Agricultural Mechanization programs can be divided into three major areas including students, teachers, and facilities. The most important concern of any program is the student who is majoring in the Ag Mech program or taking courses in Ag Mech as electives to other programs. Many of the Ag Mech courses are service oriented courses taken by students who might become farmers, vo-ag instructors, employees of various agribusinesses, or transfer students in the case of two year University programs. Ag Mech programs are broader in scope, more theoretical, and less skill-oriented than the vocational programs. Universities provide industry with graduates capable of entering positions in sales, parts distribution, field operation, diagnosis and evaluation.

Besides serving students with varied career goals, Ag Mech programs are enrolling increasing numbers of students with non-farm backgrounds and various job experiences. Foreign students with little or no farm background and sometimes with communication difficulties are also enrolled in University programs. Differences in student backgrounds is a challenge to effective teaching.

Class enrollments in Ag Mech courses, especially in laboratories, are often too large for effective teaching. Twelve students in a hands-on type laboratory are much easier to teach than 18 or 24 students. Because of instructor costs, larger class sizes are essential. Students with weak backgrounds will likely learn less and possibly fail in larger classes.

In some cases, student numbers are low in University Ag Mech programs and Ag Mech courses. Advising, scheduling and the lack of communication with industry contribute to the low enrollments. Student advisors may lack an appreciation of Ag Mech as a program of study or as a course of which the abilities and skills acquired will be greatly needed in the student's employment. Many times, students would like to take certain Ag Mech courses but cannot because of scheduling conflicts with other required courses. Scheduling is mainly an administrative problem, but unfortunately, does affect some students. Do Ag related industries really under-

stand the training received by Ag Mech graduates? A better understanding of the Ag Mech programs by industries could increase program and course enrollments.

Because many of the University Agricultural Mechanization courses must justly serve a wide clientele of students, a problem arises in finding a qualified instructor and appropriate teaching materials. The instructor must identify and understand the varying needs of the students. He must understand both the theory and the practical skills of his subject and be able to effectively teach both to the students. There is also a need for affordable student textbooks for many Ag Mech courses at the University level. A single text in farm machinery with appropriate laboratory exercises might be an example.

Facilities, tools, and equipment affect the success of a University Ag Mech program. The cost of modern facilities, equipment, and specialty tools is very expensive and often prohibitive. The availability of machinery, locations of demonstration areas and weather can be a problem with scheduled classes. High transportation costs are reducing the numbers of good field trips that are used in some of the classes. Higher costs and tighter budgets are definitely affecting University Ag Mech programs.

University Ag Mech programs and courses will continue to help serve the needs of agribusinesses and production agriculture by teaching the basic mechanical principles and skills in Agricultural Mechanization. Most of the problems in the University Ag Mech programs are not that serious or different from those in other educational systems. Better communication between educators at all levels, administration, and industry will solve many of our problems and provide many opportunities for new thrusts in Ag Mech program development.

CURRICULA IN THE UNIVERSITY

Major Problems Associated With The University Agr. Mech. Program

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Reaction to remarks made by Kenton Freberg

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Four year University Agricultural Mechanization programs encompass the six major areas identified by the American Society of Agricultural Engineers. They are:

1. Power & Machinery
2. Structures & Environment
3. Electric Power & Processing
4. Soil & Water Mechanics
5. Construction and maintenance
6. Food Processing.

There is sometimes difficulty, even by those in the profession, in understanding the differences between agricultural engineering and agricultural mechanization. Briefly stated, agricultural engineering is the program designed to train individuals to "create" technology; and agricultural mechanization is the program designed to train individuals to "further develop and use" technology.

Four year University agricultural mechanization graduates frequently become employed as the industry area or district sales, parts or service representative; self employed as farmer or agri-businessmen; post-secondary teacher; extension agent; engineering technician or technical writer--to name but a few.

Some of the problems associated with the four-year agricultural mechanics program are:

a) shortage in the number of staff positions
b) shortage in the number of qualified personnel to fill vacant positions
c) inadequate facilities
d) inadequate supply of specialized tools, equipment & teaching aids; budgets do not support purchase of all items that are needed.
e) difficulty in keeping staff current with rapidly changing technologies in agriculture

Agricultural Mechanization programs at the four year University should address the needs of five different groups classified according to their career objectives. These groups are:

a) those planning to become self employed in agriculture/agricultural business or work in industry
b) those planning to teach at the secondary level
c) those already having the associate of applied sciences degree and plan to qualify to teach at the post-secondary level
d) those planning to continue their education beyond the bachelor of science degree
e) those utilizing mechanization courses as support to their career objectives in other disciplines in Agriculture.

CURRICULA - GOALS AND PROBLEMS

HOW CAN INDUSTRY AND THE UNIVERSITY COOPERATE TO CORRECT DEFINED PROBLEMS SO THE RESULTS ARE BENEFICIAL TO THE UNIVERSITY, INDUSTRY, AND STUDENTS

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Timeliness indicates we must anticipate some of the problems identified by the previous group. We have assumed the Power and Machinery option of Ag Mechanization as the only one we are considering at this conference. Some of the problems can probably not be solved or resolved by industry, but will have to be resolved within the education system.

However, cooperation and communication must be foremost in accomplishing or resolving any of these problems.

More pertinent educational opportunities need to be afforded to the secondary and post-secondary level instructors by the universities, especially in some states. Not all of those educators are interested in working on masters or doctorate degrees. Yet, they must remain current. If industry can provide training it must be informed as to what specifically is needed.

University educators themselves must stay more current. Our group believes they must work more closely with secondary and post-secondary educators so that there is knowledge of and cooperation among these educational efforts.

To some extent credits can transfer from a community college to a university, and more is probably needed. Location of university facilities in itself can lead to more difficulty in providing for having equipment needed to provide hands-on training, which is essential, even at the university level. Costs of providing hands-on experience is very high, especially when budgets are very restricted.

University students need to have the opportunity to get as much practical experience as possible. Industry should advise universities and other educational institutions so that university Agricultural Mechanization students can take advantage of all such training opportunities including machine demonstrations, customer clinics, etc.

To summarize, more communication and cooperation is needed between the university and industry for the benefit of all parties; the university, industry, and students.

Curricula in the University

How can Industry and the University cooperate to correct defined problems so that the results are beneficial to the University, industry and the students?

Marshall F. Finner

Reaction to remarks made by Larry Hodel

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Generally, I agree with most of the comments made by Larry Hodel who reported for his group.

I am aware of the need for keeping University professors up-to-date. It is very easy to get caught in the "Ivory Tower Syndrome" and not be up-to-date with current practices and products. Suggestions which might help alleviate this problem are:

1. Send sales catalog updates to the instructor. Suggest that he insert these rather than having a secretary or student do so.
2. Schedule new product and service training schools so they are more capatible with university breaks and summer sessions.
3. Make sure that university professors are aware of schools, dates and places they are to be held.

Internships for Agricultural Mechanization students are a valuable part of their learning experience. It is important that these be available whether at the dealership, the district or at the company headquarters.

Advisory committees are important to help guide the development and modification of Agricultural Mechanization programs. They don't have to be legislated, but can be voluntary. Industry should recognize the importance of these committees and be willing to supply people to serve on them.

Recruitment of students with farm backgrounds is important to the Agricultural Mechanization programs at major urban universities. The majority of the students in agriculture at urban campuses do not have a farm background. People in industry can be helpful in encouraging young people they encounter to consider a career in Agricultural Mechanization.

Since farm wives are often involved in the selection and operation of farm machines, it becomes more important that women be involved at the sales level. We may be overlooking young women with farm backgrounds as a supply of Agricultural Mechanization students.

This conference has been very well planned and has been very useful in exposing problems and some solutions at various levels of Agricultural Mechanization. The people at Deere & Co. must be complimented for their foresight and efforts in planning this conference.

A future conference of this type, but involving other companies, should be encouraged. It is difficult to imagine who or how such a conference might be organized. Perhaps a committee of Agricultural Mechanization instructors working with FIEI and FEMA might arrange for such a follow-up conference.

CURRICULA IN THE UNIVERSITY

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It was clearly stated that the AG Engineering and AG Mechanization Programs were entirely different in final product. The AG Mechanization Program was of prime interest to the Conference as the graduate was geared to the use of existent technology. These graduates would provide the required leadership as instructors and administrators in the post-secondary programs.

The skills that AG Mechanization Programs can provide this industry are in the following related areas:

1) Basic Math, Physics and Chemistry

2) Basic Lab and Tool Usage Skills

3) Electronics and Computers

4) Attitude, Communication and Management.

Curricula in the university do not appear to be teacher oriented or geared to training post-secondary AG Mechanization instructors. Open channels of communication between universities and post-secondary colleges could encourage some specialization in this area. Summer courses geared to the post-secondary program would allow instructors to advance their knowledge without work loss.

Industry's role to aid in correcting some of the present curricula problems could include further communication, summer employment programs and conferences to keep the universities abreast of modern industrial technology.

In summarizing, it appears that there has been a lack of communication between the University AG Mechanization levels and the other areas of AG Mech. training. Opening new channels of communication will certainly improve the total concept of the Ag Mechanization "Industry".

CURRICULA - GOALS AND PROBLEMS

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The conference session on Curricula Goals and Problems included challenging and stimulating ideas and discussions from Deere & Co. representatives and educators alike. It seems apparent that one of the major achievements realized through the session on curricula and for the conference was the initiation of communication in which (1) the current and developing mutual problems were defined (2) Deere & Co. outlined those resources which might be helpful in seeking resolution to the problems and (3) a commitment to the challenge of improving education in Agricultural Mechanization.

Many challenges are facing both industry and the public educational system with the ever increasing complexity of agricultural machinery. The curriculum was explored from many different facets. Curricula, when defined as experiences which achieve the desired attitudes, knowledge, and skills, required for acceptable employment entry sums rather simple. However, the views presented indicated that the content and goals of curricula in Agricultural Mechanization are extremely varied and often vague. Common problems were presented with, seemingly, more consensus.

One of the major problems in Ag Mechanization at this point seems to be a lack of a clearly defined curricula and standards in the public educational system at all levels. The U.S. has a good educational system in place; however, not developed to its potential and the farm machinery industry is highly developed.

The following is a conceptual model of the curricula structure in place at this time which could be developed to meet the challenges we now face: (See Exhibit 1)

It is the opinion of this educator that a high priority for the 1980's should be directed at more clearly defining industries' and public educations' responsibilities and roles in the Agricultural Mechanization curriculum. In other words, what are we attempting to achieve and who is expected to do how much of what.

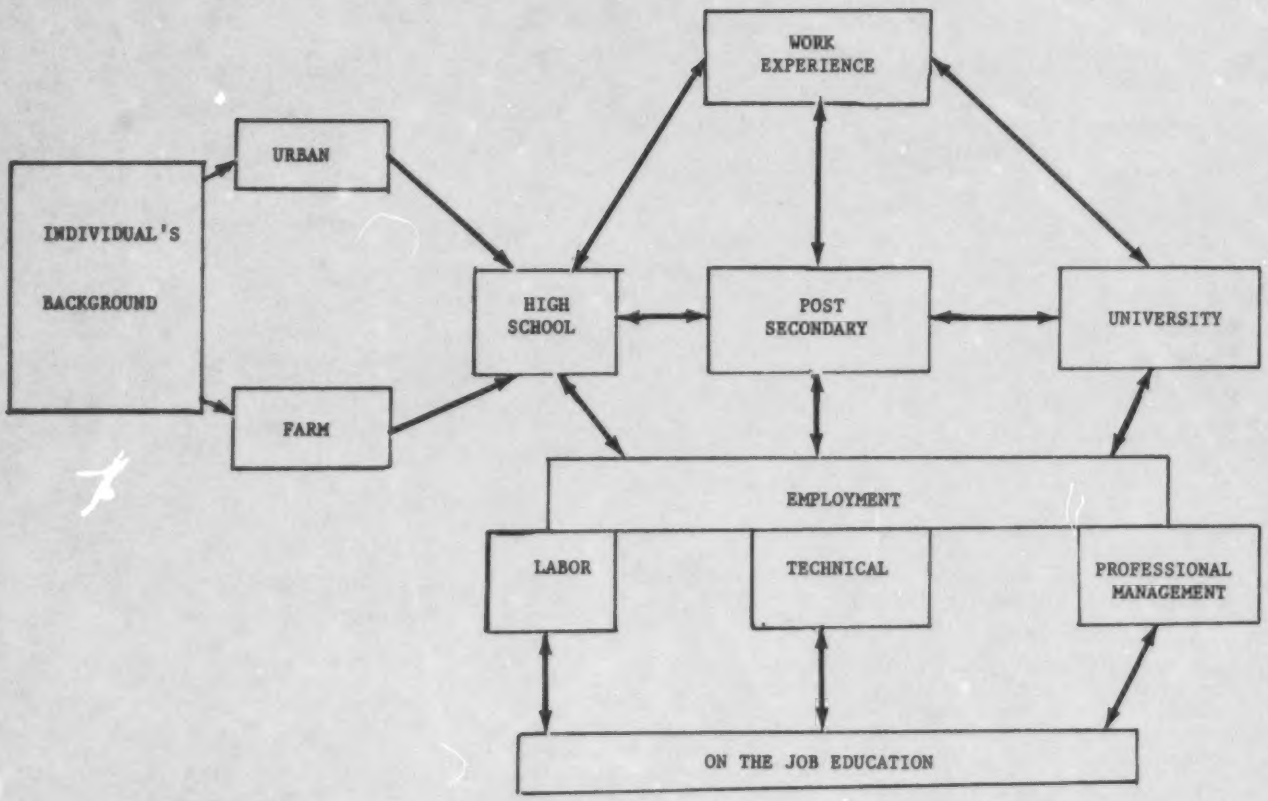
Interfacing among the different educational levels will need to be further developed among public education institutions as well as with industry and work experiences evaluated in accordance to minimum standards.

The challenge is great; however, great achievements are possible through continued open front communication.

The various professional organizations and additional special conferences aimed at further developing an industry and education partnership could provide the vehicle to further develop education in Ag Mechanization to meet the further challenges in the technology associated with the farm machinery industry.

In closing, I would like to say that I believe that the quality of any program, organization or goal is directly proportional to its commitment to excellence. I am hopeful that those of us associated with Agricultural Mechanization dedicate ourselves to a spirit of cooperation, open communication, and commitment to excellence in our various roles.

EXHIBIT 1


WORK EXPERIENCE
URBAN
INDIVIDUAL'S BACKGROUND
HIGH SCHOOL
POST SECONDARY
UNIVERSITY
FARM
EMPLOYMENT
LABOR
TECHNICAL
PROFESSIONAL MANAGEMENT
ON THE JOB EDUCATION

"If another conference is planned, I would definitely like to see more implement dealers able to give input and receive the benefits (of such a conference)."

Joseph Poulter
Poulter Equipment Co.
Illinois

INTERFACING AND ON-THE-JOB TRAINING

(Session Chairman—Bob Wolfi)

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INTERFACING AND ON-THE-JOB TRAINING

Benefits of Interfacing Secondary, Post Secondary and University Ag. Mech. Programs

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Workshop group 8 was assigned the task of exploring the benefits of interfacing secondary school, post-secondary school and university programs in Agricultural Mechanization. Our first activity was to discuss what we mean by interfacing. We decided that this could include articulating or coordinating for our mutual support and for the benefit of our students through establishing open communications.

Some things about interfacing seem obvious. In providing mutual support, programs at lower levels become student recruitment areas for programs at higher levels. Teachers' recommendation and referrals can assist in the recruitment/referral process as students proceed from one level to another.

Interfacing can also help to prevent unnecessary duplication and, what is equally serious, undesirable omissions from the training programs.

Still another benefit for interfacing programs at the various levels is to provide for continuity. We can match the training at each level to the ability and needs of the students at the respective level. For example, our workshop group is of the opinion that high school agricultural mechanization programs should be primarily exploratory in nature--programs in which the students get an understanding of basic concepts and some of the preliminary basic skills. Area vocational schools, technical schools and community colleges should go into higher levels of technical competence.

At the university level, agricultural mechanization programs broaden the student's understanding and competence in agricultural mechanization by (1) including more science and mathematics to provide a better basis for understanding the scientific principles which are applied through agricultural mechanization; (2) broading the technical competence; and (3) including courses which are more generalized and thus help the student to relate mechanization to other areas such as teaching, business, economics, and agricultural production.

Interfacing can also provide for a continuity of development of the student. Students vary in the degree and type of motivation. Sometimes a high school graduate wants to go to work immediately upon graduation and later decides to return to the educational ladder. Student's goals change; I like the comment that David Jones made this morning when he said that he got married and mortgaged and his motivation changed. Because motivation and career objectives change, we need multiple paths and multiple entry points in the training program and the interfacing of the ag mech programs at the various levels of our educational system provide for these multiple entries.

However, when this idea was brought up, we found within our group strong difference of opinion as to whether technical credit from ag mech programs can or should be accepted as transfer credit to a university. Examples were cited where this is done: Cornell University is now openly recruiting people who have completed an Agricultural Mechanization program or other technical programs in agriculture to train these individuals as vo-ag teachers; our university, Southern Illinois University at Carbondale, has a Capstone Program specifically designed for persons who have completed an Associate of Applied Science degree in an agricultural program and, in two additional years at our institution, they can complete a BS degree.

Our group did not reach a consensus on this particular point. A part of our group is strongly opposed to technical credit being accepted by the universities and others cite examples of it being accepted in currently successful programs. We still have more work to do on interfacing this particular concern.

BENEFITS OF INTERFACING SECONDARY SCHOOL, POST-SECONDARY SCHOOL AND UNIVERSITY AG MECHANIC PROGRAMS

Explore the benefits of interfacing secondary school, post-secondary school, and University Ag Mech programs

Thomas A. Hoerner

Reaction to Remarks Made By William Doerr

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In Ag Mech education we need better articulation between the three levels of education with each defining and developing their program objectives and then we need communication between the three groups.

High School - Education in Ag Mech should be at the exploratory level including broad subject matter areas and on-job training experience.

Post-Secondary - Job-entry level training including on-job training and necessary skills (technical, personal and communication skills) taught and developed at the post-secondary school.

University - University education in Ag Mech relates mostly to the teacher training program as university students end up teaching the students that attend the post-secondary schools. Problems universities face: (1) we too have a different type of student today - fewer with agricultural backgrounds; (2) future teachers are not getting the subject matter background needed to teach certain areas, especially power and machinery and electricity. I see the biggest role of the university as two-fold (1) train secondary teachers (preservice and inservice) and (2) aid in post-secondary teacher training, teaching methods and serving as inservice coordinators for technical training for post-secondary teachers through industry and related groups.

Summary:

The three groups need to communicate as to goals and objectives at each level and then decide how each can best meet their goals and complement, not compete with each other. The main benefit then is the young person who is effectively trained as a quality future employee for John Deere and other phases of the Ag Mechanizations Industry.

Where is On-The-Job Training in Ag Mech Needed and Beneficial?

Steven Johnson

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Following are major areas of training to be emphasized during on-the-job training:

- preplacement orientation for student and dealer
- work habits
- personality traits
- technical competencies
- career exploration
- personal assessment
- general understanding of business operations

Following are the employee work habits that need development during on-the-job training:

- attendance
- promptness
- work ethics (day's work for day's pay)
- effective listening
- observation of work rules
- safety practices
- personal appearance
- good housekeeping practices
- customer/employee relations -
  - talking with customers
  - assisting other employees
- employee/company relations -
  - loyalty
  - confidentiality

Following are the personality traits that need to be developed during on-the-job training:

- compatibility with peers and supervisor
- enthusiasm and "partner-like" attitude towards dealership
- empathy and interest towards customers
- ambassadorship for dealer, college and himself
- salesmanship for dealer and product irrespective of real position in dealership
- effective oral and written communication skills
- self-confidence and experience
- mature professional approach to the job
- dealing with mistakes

Following are the technical competencies that need development during on-the-job training:

- proper use of tools
- specialized service skills for particular brand of product
- application of practices learned in college
- coping with lack of special tools
- short cuts and tips from more experienced servicemen and personal experience
- handling paperwork and records
  - time cards
  - warranty claims
  - work order
  - parts invoices
  - orders
  - inventory
- exposure to formal selling techniques
- exposure to parts department operations
  - communication
  - microfische and parts books
  - proper management techniques
- proper use of dynamometer
- effective use of service manuals and their maintenance
- ability to troubleshoot and service
  - gasoline, LP and diesel engines including rebuilding and fuel systems
  - electrical systems including charging, starting, ignition, accessory and monitoring equipment
  - air conditioning systems
  - hydraulic systems
  - cooling systems
  - harvesting equipment
  - tillage equipment
  - planting equipment
  - small air cooled and liquid cooled engines

- transmissions
- final drives
- clutches
- brakes
- steering
- power take offs
- auxiliary systems
- tires including ballast

proper organization and execution of a service call

reconditioning used farm equipment including painting

pre delivery and delivery of new farm equipment

operation of all kinds of farm equipment common to the area

adjustment of all kinds of farm equipment common to the area

demonstrating a piece of farm equipment

Following are other general perceptions the student have the opportunity to explore during on-the-job training:

development of pride in oneself and personal worth and importance

how to professionally seek and gain a job including letter of request, resume and interview techniques

the technique and importance of evaluation of employees

observe that the dealership is in business for profit

his desirability and suitability for available positions in the dealership as a career choice

the pressures and rewards of having real responsibility

the need for more formal and individual training - motivation for further courses

the importance of accountability for your performance

an assessment of what is necessary to be successful in the machinery business

observe how business decisions are made

develop the ability to make proper recommendations to customers

he should be able to realize monetary compensation from the dealership commensurate with his productivity to use to help offset college costs and learn reward system

observe the psychology of how to deal with customers and other parts of the business especially if customer is irate or petty

observe exactly what the real work environment is like

observe the importance of being as productive as possible

understand the working relationship between the dealer and his supplier

Dealership personnel should have the opportunity to explore the following areas during the on-the-job training period?

students suitability as potential full time employee

make accurate recommendations for improvement of college program

observe the needs for the college program - recruitment, software, hardware for training purposes, etc. so dealership personnel can help where possible

gain ideas from student about new procedures and tools that may make the dealership more efficient

discover the importance of the dealer to create a non threatening environment for the student - the student should feel comfortable to ask questions

INTERFACING AND ON-THE-JOB TRAINING

WHERE IS ON THE JOB TRAINING IN AG MECH NEEDED AND BENEFICIAL?

GEORGE STANEK

Reaction to remarks made by Steven Johnson

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The basis for need of OJT should be determined by the student and/or program objectives. Need should also be based upon facilities of educational institution. If facilities and training are adequate to provide all necessary skills, then OJT may be deleted.

Since most 2 year programs at Community Colleges are designed to train technicians, the OJT should be a very integral part of the curriculum. The point in time for OJT within the curriculum becomes a problem when trying to decide how to fit it with skills developed in class by the students. The best route for most institutions would be to have OJT at the end of the educational training period at the institution. The reason for operating in this manner would be the problem of dealers being unable to offer specialized experiences as specific skills were learned at the institution. It should be kept in mind, that the OJT should be set up and planned so that it will expand and develop the mechanical as well as personal skills of the student.

The time of year in which OJT is included may also be a problem in some areas of the country. Some localities will find it beneficial to provide OJT in the spring due to all aspects of the business at the dealership being involved (i.e. tillage, planting, and harvesting with combines being brought in for wheat harvest preparation). It is best if the students could be placed just before the beginning of the busy period of the dealership so they would become acclimated to the dealership before that busy time occurs. Some areas of the country may find it beneficial to split their OJT periods into the spring and fall especially when most of the harvesting activities would be during the fall months.

An additional point, it would be very beneficial if a short OJT period could be provided at the end of the first or second semester of student training. This would give the student an early opportunity to get his "feet wet" in his training period and give him an opportunity to decide early if this is the career that he is finally going to give his total committment.

In summary, it is imperative that OJT provide realistic experience for the student and that this training expand and increase the skills of the student.

INTERFACING AND ON-THE-JOE TRAINING

What Are The Major Problems Associated With On-The-Job Ag Mech Training Programs?

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Some of the major problems our group discussed are:

1. The inability of students to find suitable on-the-job training employment in the Ag Mech field.

2. Placing students in the right place at the right time -- with the right employer.

3. How can the educational institutions insure proper negotiations between students and employers.

4. Third party instructor conflict between student and employer in the area of compensation and grade point.

5. The lack of instructor time to travel and contact on-the-job trainees and employers to evaluate training programs.

6. Through the course of an on-the-job training program, what controls should be used to accurately measure progress or the lack of it.

7. Establish competency basis of education and training programs to measure skills, etc.

8. Unwillingness on the part of an employer to teach or embellish student knowledge and skills.

9. Because of the lack of knowledge, training, and skills, trainees are too often placed at the degrading bottom of the "totem pole."

10. Public relations problem of the acceptance of on-the-job training programs on the part of both the educators and the employers.

Interfacing and On-The-Job Training

What are the major problems with on-the-job training?

Roger A. Hansen

Reaction to remarks made by Dan Schwitters

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My major problems with on-the-job training in the past have been with lack of continuity within the program training. Many times I have been confronted with comments such as, "I thought I was training to be a technician, not a janitor or car wash attendant." These comments cause me to believe my students are being used as clean-up type persons. Agreed, this is part of a good technician's training, but more hands-on experience is needed from this type of training.

Many of my sponsored students, such as veterans, are forbidden from such training. Some students have even dropped from the program because of O.J.T. The training site employer may say, "I need a man fulltime. Could you work 50 hours a week now, or will I have to look for another man?" This is very tempting for the young students when money and jobs are as tough to come by as they are right now. This is what I call learning or earning. What priority do we have?

Another of my concerns is the time element. Many of the businesses which employ my graduates have said, "How can you train these people in such a short time to be mechanics?" My response is that I can't. The student must be very intelligent and motivated to assimilate this much knowledge and material in only 48 weeks of instruction, which my program is at this time. Can a training site give a student the guidance and training needed to help a man in such a fix? Better yet, can the employer afford it? It is very costly to train a person in such a field. There are always come backs, slow work, and constant supervision. This is one place where I would like to praise any employer willing to accept this training responsibility. I know all the paper work and time involved in a good training program is expensive. But can you afford to take men off the street with no knowledge and train them?

Another area which has caused a problem for me is differences in technique. Many technicians use different methods for age-old procedures such as installing cylinder liners, checking bearing clearance, grinding valves, etc. When the student comes back to class and says something such as, "George down at work says why in hell do you need a sleeve puller when I've been using a big hammer for 20 years?" What do you say?

INTERFACING AND ON-THE-JOB TRAINING

HOW CAN SCHOOLS AND INDUSTRY WORK COOPERATIVELY TO RESOLVE PROBLEMS ASSOCIATED WITH ON-THE-JOB TRAINING?

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During this workshop discussion, we listed several places where we thought some of the proglems could be resolved cooperatively. Some of these were.....

1. Dealers must be willing to use the SOE Students, even if they do not plan to hire at the end of the training period. No committment to hire is needed.
2. Not only must the dealer be willing to use the SOE students, but he must be willing to assign work that is educational and not just the menial tasks.
3. Prior to the SOE experience, Early exposure to the store operation would be very helpful to the student. This would give him a better idea of what he might expect when he was on the job.
4. The Teacher, the Student, and the Training station need to mutually identify the expectations of all three. There needs to be a three-way contract, preferely written, so everyone knows what to expect.
5. It is necessary for College Instructors to visit regularily with the dealer and the dealer employees, to help him evaluate both the student and the program. THERE HAS TO BE A VEHICHLE FOR EVALUATION!
6. Advisory Councils should work with the schools to help determine the course offerings for SOE programs.
7. All dealership employees need to be sold on the program, before the program will work to the benefit of both the student and the store. This is primarily the responsibility of the Implement Dealer.
8. Educational institutions should prepare students for interviews - dress, attitude, appearance, cleanliness, etc., when they apply for possible employment.
9. Some sort of standard pay should be recommended and then agreed upon by all cooperating dealers. Would suggest something like minimum wage for a beginning, and then any promotions would depend upon the student's ability. Perhaps the amount of the wage for a given school could be determined by the advisory council. This starting wage would be on an individual basis for the individual school.

INTERFACING AND ON-THE-JOB TRAINING

HOW CAN SCHOOLS AND INDUSTRY WORK COOPERATIVELY TO RESOLVE PROBLEMS ASSOCIATED WITH ON-THE-JOB TRAINING?

PAUL C. RAMEKER

REACTION TO REMARKS MADE BY JOE POULTER

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A. Student & School

1. Attitudes and willingness to work must be prevalent in student
2. Evaluation of Students
   a. Time for instructors to do on-site evaluation
   b. Proper individual must do evaluation (i.e. not a coordinator or supervisor who is totally unaware of the jobs done by these individuals)
3. Valid evaluation documents or procedures established must be utilized in grading the trainee.
4. Don't put student in O.J.T. before he/she is ready
5. University may have more need for O.J.T. than Community College or Tech Schools due to their not having as much hands-on opportunity in their programs
6. Schools must get out and sell the O.J.T. program to dealers on benefits they can derive, not as another time and dollar commitment of already precious entities of the dealer.
   a. Merits of evaluation of a potential employee at part-time wages instead of at full-time rate and benefits

B. Industry

1. More local dealer cooperation
   a. Right job at right time
      1) Hydraulics studies, work with hydraulics
      2) Not use individual to plant shrubs and do the landscaping and never touch the mechanics end of the business
2. Don't pull the student from the program prior to their completion of the program. (i.e. for full-time employment)
3. Many dealers can use students for the summer or week-end employment instead of the direct O.J.T. type program
4. Payment should be at a rate agreed upon prior to utilization of the student
5. An individual at the dealer that is directly responsible for the direction of O.J.T. (i.e. service manager, shop foreman)
6. Dealer personnel to aid O.J.T.'s learning and not hinder his progress by being closed minded and afraid of their position.
   a. Dealers responsibility to advise present employees of his intention of O.J.T. program

INTERFACING AND ON-THE-JOB TRAINING

Benefits of Interfacing Secondary School, Post-Secondary School and University Ag. Mechanics Programs

George Shorter

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This session of the conference focused on the Benefits of Interfacing Secondary School, Post-Secondary School and University Ag Mechanic Program. Major emphasis in group discussion were centered on exploring the benefits derived from interfacing, determining the contributions provided by on-the job training identifying major problems associated with on-the-job training and identifying and resolving problems encountered by educational institutions and industry with on-the-job training.

Educators and Industry agree that a partnership in planning, implementation and evaluation of the Ag Mechanics program must exist in order to provide the type training at the secondary, post-secondary and University level for successful employment. Industry must be willing to provide much of the needed technical equipment and materials needed by the educational institutions in their training programs.

The educational institution should not be content with providing the so called "Mechanic" for industry. Trainees must possess skills and abilities in Human Relations, Public Relations, perform diagnostic and analytic investigations as well as possessing knowledgeable competences in repair and maintenance.

In order to develop fully educated, trained and skilled employees for their own interest, industry must close the gap between the trainees--educational program and the actual knowledge and skills required of those who would be employed. By taking an active part in the trainees--educational program, industries cannot only raise the quality of their potential labor force, they can also enhance their image within the educational community and to the public at large.

INTERFACING AND ON-THE-JOB TRAINING

Reaction to panel discussion.

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This conference has provided a means of allowing agricultural mechanization instructors representing secondary, post-secondary and University programs determine the interface of each of their areas with the others. Interface, according to the dictionary means, "the facts, problems, considerations, theories, practices, etc., shared by two or more disciplines, procedures or fields of study". The most important benefit of interfacing the three levels of programs accrues to the students through the articulation of "career ladder" curricula which allow the students to learn of the careers and opportunities for advancement in the agricultural mechanization field. At the secondary level, students are seeking career information and at the same time are interested in acquiring some entry level skills to use in earning money during and upon graduation from high school. With competent counseling and some work experiences, a student can choose an educational program in agricultural mechanics for which he or she has potential for success.

Students, of course, move into University level agricultural mechanics programs from the post-secondary vocational and technical programs. Therefore, the need to have interfaces of these programs and the articulation of the academic commonalities and requirements clearly stated is very important. Articulation of the three programs exists in many states with the transferability of credits and the substitution of employment experience for coursework clearly stated.

On-the-job training and Agricultural Mechanization is needed at secondary, post-secondary and University levels. If on-the-job training is properly structured, it can be beneficial to all three types of programs. The timing of on-the-job training has presented some problems and a divergence of views between industry and educators. Educators would like to place students on the job early in their program. Industry, since they are paying money for services, would like to have students later in the program so that they can be more productive members of their service team. Therefore, compromises have successfully been reached requiring six to nine months of educational instruction prior to the internship or on-the-job program.

Other problems associated with on-the-job training programs require institutions to provide up-to-date equipment and learning experiences so that the students are able to work in a dealership without receiving minute by minute instruction.

The most effective way to resolve problems associated with on-the-job training is through the effective use of advisory committees followed by visits by the instructor to the cooperating employers.

Most problems are minor and can be resolved through well-organized and frequent use of advisory committees.

FUNDING—ALWAYS A CHALLENGE

(Session Chairman—Dean Byerly)

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Funding - Always a Challenge

Post-Secondary Salaries and Staffing - Funding Sources

Allen Linster

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The major sources of revenue to conduct programs in Wisconsin's sixteen VTAE districts are: local mill tax funds up to 1-1/2 mills, state aids set at 35% statewide, federal aids for identified projects, student course and material fees, and special funding through other agencies, industry and foundations.

Since 1967, Wisconsin has been divided into sixteen vocational, technical and adult education districts with a mission of providing post-secondary education below the baccalaureate level. The districts may levy up to 1-1/2 mill local tax for operational expenditures and up to a total of two mills for operation and facilities. This local taxing power provided a base for districts to staff and construct adequate facilities for the state's 1100 vocational-technical programs along with providing support services to instructors and students in conducting high-quality post-secondary educational programs. Local mill tax provides for about 50% of the state's 300-million plus yearly expenditures. For the past three years, the legislature has imposed a 9-1/2% budget increase limit, per FTE student.

State aids for operational costs are set at 35% of the state's sixteen district average per FTE cost of operation statewide. This is based on a formula which takes into account the enrollment, the number of eligible students, and the equalized evaluation of the district. This results in districts receiving state aids at different rates, ranging from 25% of operational costs for the lowest district, to 60% for the highest.

Federal funds in Wisconsin have been earmarked for disdavantaged/handicapped and for equipment, construction, and teaching aids. Some federal funds are used for instruction in specialized areas, such as adult basic education, CETA, economic development, "high tech," and staff development.

Wisconsin has established a statewide tuition policy where program fees are set yearly at 10-1/2 percent of the average statewide FTE operational cost. The per credit program fee for 1982-83 is $14.30 per credit for students residing within the district. Students also pay a material fee for those materials which will be consumed by the student, or the instructor, in providing education. This is an average statewide fee and varies with the program. Agriculture Mechanics has a material fee of $6.00 per credit. Total student fees for Agriculture Mechanics program is $20.30 per credit. Agriculture Mechanics is a two-year, 62 credit program, and will cost the student $1,258 for the two-year period.

Industry has been used extensively in providing in-service to the staff of the Agriculture Mechanics programs in Wisconsin. The major companies and specialized manufacturers, such as Diesel Injection Pumps, have all been most cooperative in providing in-service on the latest developments in the industry and providing a continuing updating on service and new equipment through several communications media. Federal and industry funding has been used to help finance curriculum development, preparation of teaching and student workbooks, along with a wide range of teaching aids.

The major sources of funding are in the hands of the local districts and part of the political process with the legislature determining local mill rates and state aids. Vocational and technical education needs to be more active in that process if it is to keep or increase its present level of funding.

Industry and Education - Partners in Education

Funding Source

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Reaction to remarks made by Allen Linster

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Mr. Linster, you have covered well the funding sources used in your state and in general most states represented at this conference. Basically we could say the major difference would be the catagorical terms used and some significant differences in percentages applied at the source. The topic of funding tends to be complex and very often controversial in that each merged area school is vying for the same dollar via some type of funding formula with a laundry list of criteria applied, which in itself may create controversy between the districts of which Iowa has fifteen (15).

Probably the most critical area that lacks adequate funding in Iowa would be equipment for upgrading, replacement and new program startup. In visiting with my colleagues from other states, this could probably be said for ninety-nine (99) per cent of the states. This is why we feel it is imperative that staff at all levels in our educational institutions become well acquainted with their state and national legislators, keeping them apprised of the critical need for up-to-date equipment for our vocational programs. One of the most sources for equipment and expertise pertaining to the technical aspects of our programs has been industry. We would hope to continue this relationship by keeping business and industry informed and involved with our programs.

How Competitive Salaries are Determined for Post-Secondary Agricultural Mechanics Instructors

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For those of us who administer instructional programs, salary determination is a simple task. We are in a labor/management arrangement. Salaries are based on a schedule which is negotiated by our governing boards and a bargaining unit representing all instructors in the system. Instructors are paid a salary which increases by annual steps based on years of service and academic credits earned. Steps continue over several years until, through longevity, the instructor reaches the top step and remains there until resignation or retirement.

Salaries for agricultural mechanics instructors are not established to be in competition with their counterparts in industry. Negotiations do not consider specific instructional disciplines. Through negotiations, all instructors, in all disciplines, are considered equal. Our boards are thus prevented from offering premium pay for critical instructional areas.

But, maybe, it's not that "cut and dried". Let's look at some other aspects.

SOURCES

Where do post-secondary Agricultural Mechanics come from and what experience do they bring? A rather casual and unscientific inquiry around the central states area indicated to me that most instructors of Ag Mechanics find their way to current positions from:

1. Experience as mechanics or foremen in local farm implement dealerships.
2. Experience as high school Vo-Ag instructors who emphasized Agricultural Mechanics.
3. Experience in the farm equipment industry, working with major manufacturers as sales or service representatives.

My survey did not locate any instructors who had moved to Vo-Tech instruction from the college teaching ranks and I found it particularly interesting and pleasing to find that the primary source was from local dealerships.

CURRENT SALARY LEVELS

My informal inquiry also related to salary levels. My several informants tell me that the beginning base salary for an Ag Mechanics instructor, post secondary, falls within the range of $12,000 to $14,000 annually for an academic year, 9 to 10 month assignment. If an instructor is assigned summer teaching, a separate appointment and separate compensation is assigned. Apparently, it is common to compensate summer school instruction at a lower rate.

All use a salary schedule. Over a period of twelve to eighteen years, an individual instructor can move from the lowest salary on that schedule to the highest. While the beginning salaries fall in a narrow range, top salaries fluctuate widely. Although $24,000 to $28,000 appears to be most common, $35,000 is possible for a nine month assignment at a doctorate level.

The most significant difference in earnings, however, is in the area of fringe benefits. Fringe benefits, including items such as health insurance, life insurance, dental insurance, retirement funds, tuition compensation, etc. range in value from approximately 10% of the annual salary to over 30%.

COMPARISON TO INDUSTRY

There is not as much difference in salary levels between instructors in the Vo-Tech schools and industry as I would have expected. Beginning salaries tend to fall within the range mentioned earlier. However, individuals in industry who focus quite heavily on training, probably have higher compensation than their post-secondary counterparts. Fringe salary benefits in industry tend also to be at the higher side of that range, 25% to 30%. Also, while a labor/management salary contract is not common at this level in industry, the salary levels are based on the

job description and the position as established, rather than individual negotiation.

HOW THE SALARY IS DETERMINED

It seems a common practice in post-secondary to place heaviest emphasis on an individual's practiccal experience as the primary qualifier for teaching. I found this to be true in each inquiry. If individuals, so selected, do not have educational background, they are expected, or required, as a prerequisite for continued certification, to take courses in educational theory and methods. In some schools or states individuals are expected to earn a degree. In one instance, I learned that an individual could be employed strictly on the basis of work experience and could advance to the top of the salary schedule without ever earning a degree.

WHY INDIVIDUALS CHOOSE VO-TECH AG MECHANICS INSTRUCTION

The instructors contacted were universally satisfied with their occupational choice and listed these as the primary reason:

1. The students. Motivated or easily motivated students who have made a career decision and have a solid sense of purpose.
2. The high level of job security offered by the teaching profession.
3. The practical and challenging nature of Ag Mechanics instruction.

On the other hand, they note the high priority placed on training in industry and the fact that for industry trainers, there is greater opportunity for advancement while encountering a higher job risk.

SUMMARY

Salary levels are determined by bargaining unit and management negotiations. The degree of need for instructors of Agricultural Mechanics, or any other single discipline, does not weigh significantly in establishing that salary schedule. Thus, as administrators we must, when filling a position, find individuals who meet our qualifications.--Our challenge is to find top quality instructors.

Post-Secondary Salaries and Staffing

How Competitive Salaries Are Determined

Dwight Mobley

Reaction to remarks made by Don Schwarz

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I have personally found it far from easy to employ non-degree people and find their place on a salary schedule that will (1) be competitive with salaries in industry and/or (2) provide a desirable salary increase each year of satisfactory service.

Those problems confronted include (1) devising a salary schedule that will adequately equate work experience in industry with college credit; (2) allow for yearly increments both horizontally and vertically using credits for in-service training, college extension courses, and work experience; and (3) provide incentive for professional development.

It is not unusual to find instructors employed because of their work experience in industry thrust into such responsibilities as lecturer, program coordinator, counselor, and program developer. Reimbursement for these responsibilities should be competitive.

FUNDING--ALWAYS A CHALLENGE

HOW DO WE KEEP OUR STAFF UP-TO-DATE

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INTRODUCTION

Being up-to-date is a key to vocational education. Many years ago Charles Prosser, Director of Dunwoody Institute in Minneapolis, Minnesota, said in many of his writings that vocational education should be offered by a school only when the proper tools, equipment and skilled instructors are available. He continued further by saying that unless we have these basic three ingredients it is better not to offer the program. I am sure that if Dr. Prosser was with us today he would re-emphasize the fact that vocational education must reflect the current state of the art for whatever occupational area is being taught. So, therefore, I suggest that all of us who are involved in this industry/education conference recognize that there is no alternative to "keeping up-to-date" if we are to offer a vocational instructional program. There is only one way and that is the right way, a technically competent instructor equipped with the proper tools and equipment.

There are many ways of checking for how well we are doing in our being "up-to-date". A few of these indicators are:

1. Industry Seeking Consultation by Instructors - Updated instructors with current knowledge, skills, and attitudes are recognized by business and industry people. This recognition is shown by the communication that exists between the two by either visits to the school for information or letters and phone calls. There is a mutual benefit from this dialog in that business and industry is picking up the needed information and the instructor has another bit of information that is an indicator as to the direction that particular company is going.

2. Successful Placement of Graduates - A good placement record coming out of any instructional program is one of the top indicators of excellence in instructional programming. Successful placement of the graduates means that the school's product, the graduate, meets the needs of the business or industry that is doing the hiring. If the employer feels that the graduate is well-trained for his business the program has to be up-to-date.

3. Employers Who Come Back - If we agree that successful placement of a school's graduates in business and industry is the key indicator of the quality and updatedness of the instructional program, then we must agree that the employers who continually come back to the school for more employees becomes an added positive indicator of high quality.

METHODS OF STAFF UPDATING

There are many methods by which we as human beings can keep ourselves current and renewed for a good productive life. In order to zero in on our discussion for today, we will consider a few of the methods that I believe are key programs for vocational instructors in "keeping up-to-date". They are:

1. Collegiate In-Service - One of the first sources of in-service training that we as educators think of for advanced studies is collegiate course work. In many of our states there are very fine opportunities for both on-campus and off-campus extension programs which relate to vocational instruction. I believe it is the duty of all of us as instructors, vocational administrators, and business persons to give the proper input to the colleges and universities as to needs. This form of keeping up-to-date through college courses does not need a lot of encouragement since most educator salary schedules are directly tied to the number of credit hours of instruction taken at institutions of higher education.

2. Industry Service Schools - In many of our vocational courses the emphasis is placed on current knowledge and skills of current industry practices. The major concerns to school personnel are what schools are available, when are they available, and who is going to stand the cost of the participation in the service schools. I wish to encourage various industries to make their service schools available to school personnel, to get the information to the schools either through local dealerships or various professional organizations that represent the vocational educator. An instructor who has attended an industrial service school will be aware of the proper tools and equipment being used and will be kept informed of the current state of the art. They will become knowledgeable of the changes taking place and thereby will be more aware of the need for further reading and/or need for contact with the industry so as to continually offer updated information to the student.

3. Student Placement - I recommend to all schools that a basic philosophy be adopted and/or maintained, that the vocational instructor be ready, willing, able and responsible for placing his or her students. I believe that the best staff updating is accomplished when teachers and business come together for mutual benefits in the placement/hiring of a school's graduates. In the process of placing a student, the teacher finds out the necessary knowledge and skill requirements for the job and, thereby, has a very direct and updated knowledge of that particular business's needs. This information can then be given back to the school and the decision made to update the curriculum. This updating may then result in additional course work on the part of the teacher and/or job skill updating at an industry school or on-the-job training with a business. Normally this on-the-job training for a new skill update by the teacher does not need prolonged full-time work, but rather short visits with the skill updating getting done back at the school. (In some cases, however, if specialized equipment is needed the instructor may have to get the training at the industry site and then at the proper time the implementation of this instruction in school would come about after the necessary tools and equipment have been purchased by the school.)

4. Constant Industry School Dialog - When we talk about vocational education we talk about an education program which should have a day to day contact with the industry that is being served. During this conference our major emphasis is on the agri-business industry. If we in the vocational education business and the people in agri-business keep our doors open to one another, we will communicate our needs. We in vocational education want to be current. Our friends in business and industry want employees who can produce. We have compatible goals. If we work together we will "fund" each other. Industry will help sell tax packages which support a school system and/or they will contribute tools, equipment, supplies, or direct monies to the school and, in turn, the school will return back to the industry highly motivated and productive employees. We both win and together we make a strong America.

5. Instructor Enthusiasm - I wish to finish my comments on "How do We Keep Our Staff Up-to-Date" by saying that it all starts with an enthusiastic instructor. An instructor who understands and is proud of his or her talents and an instructor who wants to turn out a top quality product. What is that product? It is a graduate who finds success in business and industry and that success is measured by profit for a company, good salary for the employee, and finally, an enjoyable work experience for the employee. If an instructor is enthusiastic about his or her field, they will seek out all avenues for keeping up-to-date.

FUNDING - ALWAYS A CHALLENGE

How Do We Keep Our Staff Up To Date?

HAROLD SWANSON

REACTION TO REMARKS MADE BY JOHN VOTCA

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We are either trying to keep up to date, or we are going to be left far behind and we in vocational education must not let this happen.

Some additional methods of keeping our staff up to date are:

1. College In-Service - including improved teaching techniques, advising and recruiting methods.
2. Industry Service Schools - to provide update on specific equipment possibly held during summer, or O.J.T. for instructors.
3. Find out training needs when on O.J.T. visits with employers and incorporate these into the curriculum.

In our area, the low starting pay scales of dealer service people is a problem. We are turning out a skilled worker who knows he will have trouble getting the kind of pay he wants for several years. How can we update the dealer to the fact that he (the dealer) is either a trainer of mechanics with low pay and high labor turnover, or an employer of trained people with a higher wage scale and low labor turnover. A dealer finds it difficult to be both, but I feel he doesn't always admit his position because his old-time line mechanics expect to be paid more than the trained newcomers, even though they may not be updating themselves.

An updated instructor is an enthusiastic person who is much more effective in his job because he has a feeling of personal worth.

We offer our students a course called "Job Searching Strategies" which has been extremely effective in helping the trainee professionalize their job seeking efforts. It includes personal evaluation, resume and application preparation and interview training. It has had dramatic effects improving the employment chances of vo-tech students.

We know that high-tech equipment is here, and we in education will try to do our part to prepare people who have the knowledge and skills to maintain them - and we welcome industry's call for close cooperation.

FUNDING--ALWAYS A CHALLENGE

WHAT FACTORS AFFECT EQUITABLE TEACHING LOAD?

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The factors that affect an equitable teaching load must be considered in relation to the use that will be made of the comparison. The question needs to be asked, "Equitable to what?". Equitable to a forty hour work week as used in industry or equitable between individual instructor's work loads within the college. In the latter instance we would be equating between a teacher teaching mechanical courses compared to a teacher teaching communications, math, history or science type courses. Another possibility would be to define what is a "fair and reasonable" work load. A fourth comparison that might be used would be measuring work loads between several instructors that are teaching in the same or similar mechanical programs within a given college. Whichever of these you are going to be using, different factors would be more important and others may not be relevent at all. Without knowing specifically which of the situations this equitable teaching load will be applied to, I will list a number of factors to be considered when assigning loads and discuss each of them briefly.

One of the first factors that comes to mind when we consider teaching at the college level is the type of class we are teaching. Is the class considered to be primarily a lecture class with quizzes, exams, outside assignments and perhaps a text book or is the class primarily a shop type class in which most instruction is done on mock-ups or live units that are disassembled then reassembled. It is likely that some classes will be a mix between lecture and lab with exams and text books included. The number of clock hours needed to generate a credit hour in each of the situations, according to the Illinois Community College Board, should be approximately the same. In a lecture class setting students are expected to spend a total of sixteen hours in class plus approximately three hours out of class for every one hour in class to get a single semester hour of credit. The total of these sixteen in class plus the out of class work would approximate sixty four hours. In a laboratory type class with little or no outside assignments, the in class to out of class time ratio runs closer to three to one with a limited amount of outside class work. This means there would be a lot longer time spent with the instructor and students in the college classroom/laboratory setting to get one credit hour. Forty eight hours would be spent in class but much less time would be spent outside of class. In a lecture-laboratory mixture class, different ratios would apply but essentially it would still be in the neighborhood of sixty four hours of time per credit hour. Instructors teaching a lecture class would have, theoretically any way, a great deal more time in preparation and following up on the outside work to see that it is done and done correctly. Therefore, they would spend less time in contact with the student in class as compared to a laboratory class. According to state rules and guidelines, this should be an approximately equitable load situation.

Another factor to be considered when talking about the laboratory type class (or shop class as some use the term) is whether the instructor is required to secure outside "live" machines to be used in the lab class or is all the laboratory done on dummy or in-house machines. These units may be partial machines such as an engine, hydraulic pump or diesel pump that is not on a tractor or live unit. It is easier and quicker with less work for instructors to use the in-house machines once they are mounted, secured and tagged so that the make and model they represent is known. If an instructor has to keep locating then arranging for transportation to bring in outside live machines (tractors, combines, planters) more preparation time, more outside of class time is needed. Therefore the work load is greater for outside live machines that are used in class than the in-house or dummy machines. Along this same line another concern needs to be considered to measure work load. Is the instructor required to order, pick-up, bill the owner, and collect for the parts that are used on a machine that is brought into the laboratory. If the instructor is required to order and physically arrange for parts to be present during the lab time and take care of paying for the costs incurred, more work is required. There is more time and more paper work, more transportation problems, therefore, there is a

hidden workload for the instructor. The other side to this problem is that if the instructor does get the parts they are more apt to be the correct parts and they are more likely to be at the school when needed. The alternative is for the owner of the machine to order, deliver and pay for the parts that are needed to repair the machine. This will work but many times getting the parts to the school shop when they are needed is a problem because the owner has other business and personal obligations and does not understand the importance of having the part at the time that the class meets.

Another consideration in measuring work load is how the class is scheduled. Is the class scheduled a few hours a week scattered over an entire semester or is the class condensed or block scheduled. Block scheduling or condensed courses are much more rapid in their completion though the same total time is used. With block scheduling, only one class is being conducted during any given week or two week period and the instructor is concentrating on this particular class. In many ways this block scheduling is simpler and easier for the instructor because all of his time and effort can be devoted to the class being taught, whereas the instructor teaching several classes simultaneously with the more traditional college approach must be dividing available time among them all.

Has the instructor taught the course in question several times recently or is this a first or second time for teaching the course? The answer to this question leads to another factor to be considered. Anytime an instructor teaches a course the first or second time, even if the instructor is totally qualified to teach the course and familiar with the content, it takes a great deal of extra effort, extra planning and extra reading to be self-confident enough to do a good job of teaching the course. So first or second time teaching of a particular college level course is a great deal more time consuming and more of an effort for the instructor.

Another factor that is many times overlooked but quite important is the number of instructors that are teaching in the program. If several instructors are teaching in the same major or same program area, specialization is possible. The instructor can specialize within two or three areas and therefore becomes more proficient in teaching those content areas. A program in which there is only one or two instructors or one instructor plus a part-time instructor, the instructor has to spend more time and effort keeping up in all areas. The areas that are often specialized are electrical, engines, power trains, hydraulics, diesel fuel systems, combines, machinery and maybe some related management of the business. The specialization that is possible by having several instructors usually results in a higher quality instruction to the student.

An instructor's preparation for the job is another factor that should be considered. Does the instructor have a background of college training, does the instructor have teaching experience or is the instructor relatively new to the teaching process? Does the instructor have industrial work experience or practical work experience on the job? Each of these things is important but one is not a great deal more important than another. A person who has a college background has an easier time with writing a course syllabus, course preparation, course evaluation and feels more comfortable using media material. The instructor who has a strong industrial background and many years of work experience has a vast knowledge base from which to draw in quoting examples, and in teaching the laboratory courses is more self-confident and has an easier time in leading the students through the lab work experiences. The ideal is to have an instructor for the college level with both college training and experience and this is what is specified in Illinois Community College Board Guidelines.

Another factor to be considered is the program design. Is it designed to concentrate the instruction on a very narrow or a very broad scope? Each college program or trade school program is designed to be a certain length of time. Two years is allotted to the ag mechanics program in most community college programs. Whatever the length of time, there is a limited amount of time available. Most instructors in most programs could use more time to better the education of the students. If the instruction is limited to just tractors and combines in a farm mechanics curriculum, it allows more time for these most complicated machines. The students will learn the basic systems more completely and still learn some mechanical skills in general. If the instructional program is broad in scope and covers tractors and combines plus planters, lawn and garden equipment, trucks and industrial diesel equipment, the students are exposed to more different systems and types of machines. However, there is less total time available to teach in any given area, therefore, in many ways students are given a small dose of everything and are not as well equipped to do anything well. This has an impact on the instructional load because the instructors are required to teach many more things and arrange for many more laboratory projects. The students and the instructors in a narrow scope program must depend upon the transfer of learning and related knowledge to be able to do the jobs on the machines that were not covered in school.

A simple factor that is often considered is the total number of students assigned per instructor. The more students assigned to an instructor, the bigger the classes and the more work involved. There is a practical financial concern with having too few students per class. If there is a very small class size of only two or three students per instructor per class, many types of interaction and bringing out ideas from the group are lost. However, too many

students definitely increase the work load. At our school we feel that between eight and fourteen students per class, especially a laboratory type class, is as many as should be assigned. Lecture classes are able to handle many more without much deterioration in quality but there is a limit to how many there can be for instructor and student interaction. While considering numbers of students in laboratory classes, the number of work stations (project centers) that an instructor can supervise and the number of students at each section are relevent. Of course the greater the number of work stations and the greater the number of students per station, the heavier the work load.

Another factor that is sometimes not considered by persons measuring work load, especially when concerned with laboratory classes, is whether the laboratory teaching space is used by only one instructor or is it shared between several instructors. It is much easier and much less work load for the instructor if he is using the equipment and the teaching space by himself. It takes time, a great deal of cooperation and care protecting your projects if several instructors or classes are using the tools and the same work area.

The amount of other institutional duties the instructor is required to do is a simple factor that we should also be sure to mention. Examples of these duties are: registering students, committees on governance, curriculum, planning and recruiting of students. The greater the number of duties an instructor is expected to do, outside of teaching, the larger the workload. In several situations, instructors have neglected preparation for teaching to spend their time doing some of these other institutional duties.

Another factor is concerned with scheduling policies at the institution. Are schedules constructed to allow an instructor to attend work shops or visit businesses to keep current. To help an instructor to be enthusiastic and have initiative in his teaching, it is desirable to attend work shops and professional meetings. This, in effect, lightens the load on the instructor. If the teaching load is defined in such a way that it severely limits or puts a great deal of pressure on the instructor whenever an attempt is made to go off campus for one of these activities, the load is increased.

One more thing that should be weighed when measuring factors in work load are the environmental factors in the area in which teaching is to take place, be it the classroom or the laboratory. Are the environmental factors optimum for learning? Environmental factors related to learning are ventilation, heating, cooling, visual distractions, audio distractions, maintenance and general repair. It is much easier for an instructor to teach in correctly ventilated, heated, cooled, quiet surroundings than when there are various visual and audio and other distractions.

For programs that have supervised occupational experience or on the job training as a part of the program, a factor to be considered is the timing of the instructor's classes. Is time given to the instructor for the placement of students prior to the starting time of their supervised occupational experience? Some institutions do not allow this time and this puts an excessive burden on the instructor who is teaching a class and is expected to have students placed at the starting date of the supervised occupational experience. Also, during supervised occupational experience, is the instructor expected to teach classes on campus or is the instructor free to do supervision? If the instructor is required to teach classes on campus, are these classes clustered to provide for some free days or free time to visit? To allow time to visit, without on campus classes, is desirable to lighter work loads.

This is a listing of many factors that need to be considered whenever weighing an instructor's load or trying to decide if this load is equitable to another work load. There are other things that affect an instructor's success or failure and thus might be loosely construed as factors concerning work load. The instructors initiative, attitude and enthusiasm toward his job are important factors. An instructor who is strongly motivated to be successful and do a job that is of top quality, will spend extra time, do extra things, work on extra teaching materials and thus increase his work load. Even though these are desirable traits, they are time consuming and when determining work load these traits should be considered. Initiative added to enthusiasm that an instructor has when carrying out his responsibilities are sometimes the most important attributes and to penalize an instructor by overloading him is very detrimental

Many of the factors are nebulous, hard to measure and almost impossible to get on paper. Yet, all effect an equitable teaching load in a college mechanics teaching situation. When loads are being considered, it takes someone knowledgeable of the factors that are involved and knowledgeable of the instructors to be able to give equitable loads to all persons.

Reactor Panel Response

"What Factors Affect Equitable Teaching Load"

Dr. Craig H. Morton

Reaction to Remarks Made by Brian Telander

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If we were to engage ourselves in the task of trying to determine what equitable teaching load is, we would, by necessity, be obliged to establish a standard by which to judge that work load. While it is a formidable temptation to use the industry standard 40 hour work week as a yard stick, it must be remembered that gazing at the greener grass on the other side of the fence can easily breed discontent and, as almost any educator will admit, our career choice was made for reasons more important than work hours of salary.

A more realistic comparison might be made by examining work loads of other Agricultural Mechanics instructors at other institutions. This approach is not without its own pitfalls as teacher missions and responsibilities vary greatly from school to school.

It is submitted that the following factors affect equitable teaching load. I have divided these factors into three groups with those factors generally common to post-secondary technical training programs, non land grant four year programs, and land grant institutions being included in group one. Group two includes those factors which tend to enter into the instructor work load in the four year programs at both land grant and non land grant institutions. Group three includes those factors which tend to enter into the instructor work load only at the land grant institution.

Group I-Post secondary, non land grant four year, and land grant four year programs

1. Number of clock hours required to generate total credit hours
2. Hours required to secure teaching aids
3. Hours required to procure supplies, parts, and building materials
4. Distribution or density of teaching hours
5. Number of times courses have been taught previously
6. Degree to which instructor can specialize in courses taught
7. Relevance of instructor training to teaching demands
8. Ratio of students to instructor
9. Capacity and depth of laboratory facilities
10. Flexibility of laboratory scheduling for classes, class preparation, and maintenance
11. Considerations in scheduling for professional improvement
12. Considerations in scheduling for placement and visitation of OJT students
13. Number of student advisees and depth of advisement
14. Responsibilities with clubs and organizations
15. Requirements in shop management and maintenance

Group II-Four year programs, non land grant and land grant

16. Research and writings
17. Student-teacher visits
18. Teaching of off campus courses
19. Judging team responsibilities
20. Involvement with FFA/4H contests
21. Responsibilities with school research and demonstration farm
22. Membership on graduate student committees

Group III-Land grant programs

23. Extension activities
24. Secondary curriculum development and instructional materials development

In summation, there are a large number of factors that affect equitable teaching load and these may vary considerably among the various institutions as job definition and mission change.

POST-SECONDARY FUNDING

POST-SECONDARY EQUIPMENT AND FACILITIES--SOURCES OF FUNDING

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My presentation this morning will cover the sources of funding for equipment and facilities in our community colleges, technical colleges and area vocational-technical institutes. These are the two-year institutions that train technicians for the farm equipment dealerships in our five state area. Higher Education finance is a large topic and it would take several days to adequately cover the subject. Hopefully, I will be able to superficially touch on several sources of funding and identify a few ways to better utilize the funding that we can generate.

The federal dollars for vocational education move into states as block grants to the departments of education. The state legislators, boards of education and chief state school officers may all have some input as how the dollars flow to the local or regional educational agencies. Categorically, these funds may be earmarked for salaries, travel and/or equipment. Federal vocational dollars must be matched with state funds.

State legislative appropriations for capital, in the form of equipment, are made for various educational agencies. The state agency may fund equipment for a specific program or make block grants to the institutions allowing them to utilize the funds based on their priorities. Also, the states' legislators make direct appropriations for construction to educational agencies or sell bonds to generate construction dollars. Usually there must be local or regional match for construction.

The local educational agency may use fund balances or vote a bond issue and sell bonds for construction capital. The local educational agency may have a tax levy to generate capital for equipment purchases.

Student tuition is another source of revenue for post-secondary institutions.

The private sector may build facilities for an institution and lease them back to meet their space requirement.

Many times industry makes outright grants of equipment for teaching aids to an institution. In some cases they lend equipment for teaching aids to several institutions requiring them to be rotated through the system on a scheduled basis.

I would like to use the "Area Vocational-Technical Institutes" in Minnesota as an example of how resources for capital, in the form of equipment and facilities, are generated.

The system has been built by a combination of state appropriations and local or regional bonding. Originally the local K-12 district requested permission for construction from the state board of education, and if approved, voted a bond issue up to their bonded indebtedness. The state legislature then appropriated funds to pay off the locals bond retirement. Presently, the state legislature sells state bonds for 85% of the construction approved and the local or regional agency must bond for 15% of the request. In a few instances the legislature has approved the utilization of local fund balances for construction.

Equipment funds are generated by Federal and State dollars. The ratio of Federal dollars to State dollars is determined by the legislature and is 15 State to 1 Federal presently. The state legislature appropriates equipment funds categorically to the state board for vocational education. Each institute then negotiates for equipment dollars at the specific program level. There isn't a local or regional levy for equipment in area vocational-technical institutes in Minnesota.

Tuition can't be utilized for equipment purchases in Minnesota.

Considerable equipment has been donated to the system by the private sector to be utilized as instructional aids.

We continually ask the question, "How can we generate new resources for meeting equipment and facility needs in the public educational sector?" I believe the possibility of finding new sources in the public sector is very limited. However, we must become more politically involved to acquire a larger portion of the pot. We must work more closely with industry to acquire state-of-the-art teaching aids. We must be more innovative in the way we utilize present resources within our own institution or cooperatively between institutions. We must redesign our delivery system and offer programming to our students in blocks of time when it is convenient for them to participate. These procedures should allow us the opportunity to better utilize our capital resources.

Post-Secondary Equipment and Facilities--Sources of Funding

Larry D. Case

(Reaction to remarks made by William Hohenhaus)

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Bill has outlined the sources of funding which are commonly used by our public institutions. Basically, they include Federal, State, and local public funds, and private grants and aid. Funding for facilities usually include some type of bond approval and selling activities. Bill suggested that private funds be used to build facilities and then rent or lease to public institutions.

We are all aware of the problem of the reduced availability of funds from both the public and private section. When this happens, it causes us to evaluate and prioritize, which is good, I feel. We are in a new age. . . at least new for a lot of us in this room. We have been in an era of abundant funds. Now we must become better managers in order for us to accomplish our purposes. We must plan our work, and work our plan. We must become even more accountable, so that when we request support from either public or private sources, our requests will be met with success.

In order to become more effective, we will have to evaluate some of the existing procedures such as course design, full utilization of present facilities (i.e., summer months, after regular school hours), etc.

In summary, educators, industrial representatives, and students will need to work closer together to accomplish more with less if we are to continue maintaining and developing our strong agricultural industry.

FUNDING - ALWAYS A CHALLENGE

Post-Secondary School Equipment and Facilities
What are Facility and Equipment Needs

Richard E. Linhardt

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FOREWORD

In recent years the ever expanding program of vocational education in agriculture has placed increasing demands on the existing facilities for agricultural programs. The facility requirements of the new curriculums in agricultural mechanics cannot in may respects be met by the existing facilities designed for the production agriculture curriculum. The equipment and buildings needed for the newer curriculums are also quite different.

FUNDING AND FACILITIES

Building Costs

The cost of vocational shops for the period 1950 to 1981 is as follows (See Exhibit 1). The figures are from S.P.I. Office, Washington State (1), Olympia, Washington. These figures represent costs for new construction and masonry construction. Steel buildings are 40 to 50% of these costs and have generally followed the same inflationary pattern. Current information indicatus that building costs since 1981 have dropped but averages are not yet available and because of the state of the economy there are fewer being build to compare. These costs result in more steel buildings for agricultural mechanics and likely is a trend that will continue.

Enrollment

Secondary school enrollment for Missouri (2), and I assume Missouri to be representative of mid-western states, has a decrease in enrollment in grades 9-12 as the graph indicates (See Exhibit 2). There are areas of the state where enrollment has increased, therefore, the enrollment figures given indicate the state as an average. Rural areas, agricultural areas, are hit hardest because of smaller enrollments per school initially. The projected enrollment for the next two years is a further decrease of 1-2% per year. Note the number of students (M) is in thousands.

These figures for secondary education 9-12 are very comparable to secondary vocational enrollment. Enrollment for post secondary lags secondary by 4 years. The number of 19 year olds in 1994 will be 29% less than 1978, with the exception of 1987, a year which reflects the post Vietnam phenomenon.

Research

The average age of facility bulletins published by State and University is 10 years old. Many of the more recent publications are mere reproductions of the older publications. Most of these bulletins do not refer to or meet best practice, building codes or safety standards to follow. These standards are just not published for agricultural mechanics. More importantly, most new agricultural mechanics facilities follow a 1½ to 1 (4) ratio of length to width and generally are very similar to facilities of other vocational areas. Surely more work needs to be done to improve the facility to maximize learning.

Industry and University research is lacking on facilities. It would seem logical that training facilities and industry facilities for agricultural mechanics should have a lot in common. The Texas Agricultural Mechanics facility bulletin has material for planning tractor mechanics facilities. However, there are no similar materials available for machinery showing space for each machines.

Challenges

There are many challenges that face agricultural mechanics in the 1980's. Some of these are:

1) building costs,
2) availability of funds,
3) declining enrollments,
4) relationship with industry,
5) flexibility of facilities,
6) space/student for agricultural mechanics,
7) remodeling and adapting existing facilities and,
8) cooperative research on facilities-equipment placement-time and motion studies.

Agricultural mechanics should be planned, organized and facilities designed to "maximize

learning, minimize student-teacher effort and minimize wasted time and motion" at the least cost.

References

(1) Superintendent Public Institutions, Washington State, Olympia, Washington.

(2) Missouri State Department of Elementary and Secondary Education, Statistician, Jefferson City, Missouri.

(3) Charles Henry, Vocational Finance, Missouri Department of Vocational Education, Jefferson City, Missouri.

(4) Modern School Shop Planning, 7th Edition, Prakken Pubications, Inc., Ann Arbor, Michigan.

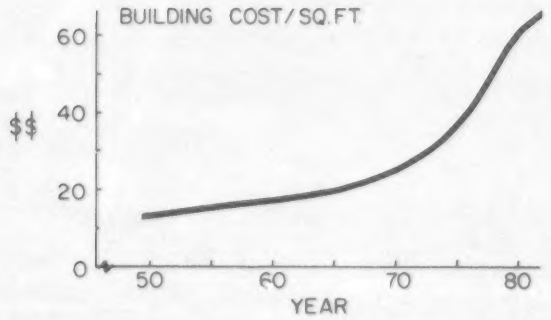

Exhibit 1-- Building Cost/sq. ft.

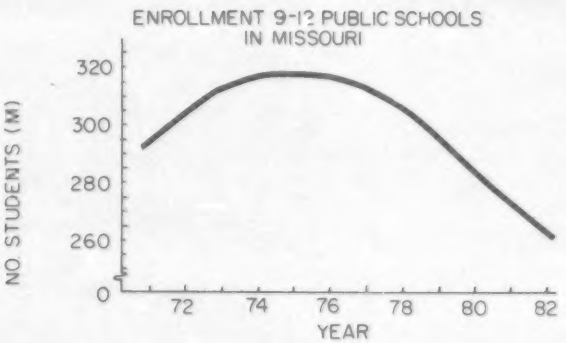

Exhibit 2-- Enrollment 9-12...

FUNDING -- ALWAYS A CHALLENGE

WHAT OUR FACILITY AND EQUIPMENT NEEDS?

FORREST BEAR

Reaction to remarks made by Richard Lindhardt

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The building cost per square foot has been increasing and Dr. Linhardt has indicated that it will decline.

I would probably disagree with his concept as to how far it will decline. I don't expect a big decline in the cost of labor, architects, engineering and other raw materials. I do expect a decrease in interest rates which will most certainly lower the cost of building. Cost of construction materials is often regional, thus do not have a preconceived plan that you must have a brick, block or steel building. When the bid comes back, the 'low buck' building might be tilt up prestressed concrete design. Construction costs are dependent somewhat on building materials, labor costs and the season of the year plus the stack of work orders at each firm making the bid. We may be in a "buyers" market and the time is approaching for construction of new facilities.

Decreased enrollment is occurring in our classes and our immediate hope for changing these numbers can be to offer courses attracting non-traditional agriculture students or look forward to the reorganization of the two neighboring school districts. Maybe there will be shared facilities or shared students. Fewer students will be a problem in the immediate future.

In reality, with fewer students, maybe our shop facilities will finally meet the requirement of 150 square feet of free floor space per student. Maybe the enrollment will drop from 20 to 24 per shop class to the recommended 12 to 16. Vocational Education was never intended to be an instructional program to mass produce a product. Let's get away from the syndrome of jumping through the general educators hoop of regulations and concentrate on what we know how to do best-- the education of students who have a marketable skill and can become employed.

I do not see the need for a panic to plunge into a research project on the design of Agricultural Mechanic facilities. Consider these thoughts. First, the architects and design engineers already have the code books and, if not, they will be the first to receive copies following standard changes; second, we should not imply that all the school facilities being constructed today are meeting the already established standards; and third, if I can convince a school to construct a facility larger than our presently published specifications, I will base my recommendations on data released by Deere and Company on building specification for dealerships.

Basically, the problem is not a rewritten set of building codes but the challenge to obtain cooperation from school administrators. Too many administrators say, "It's the architects building so don't destroy the aesthetics. Remember in agricultural mechanics, we want functional buildings. The taxpayers own the building and if the architect won't listen, hold on attitude adjustment session. Those writing out the checks do deserve a few considerations as should the teachers using the buildings.

Follow the lead of that educational slogan, "Training students for the world of work." Go to that successful implement dealership and observe how man and machinery are managed. Look at their tools and equipment to guide you in purchasing these items. Somehow communicate to your administrators that your department must have the newest equipment to produce a finished product that is marketable.

Good educational programs financed by the school districts must become the result of backbone not wishbone. If you have a product which will sell, your requests will stand on their two feet. If you have the "give me" attitude, the taxpayers should ask, "What did you produce with the last shipment of funds?" Too many educators talk accountability and their analysis of accountability is where they spent the money rather than what did they produce with the funding.

Attitude adjustment is needed for many. Education is not an expense -- it's an investment in the future.

EQUIPMENT AND FACILITIES

STAFF INVOLVEMENT IN PLANNING

Dr. Donald L. Ahrens

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The administration and staff of post secondary schools have many responsibilities. One of the responsibilities of an administrator is to hire competent staff. It is the hiring of good staff members that can make the job of being an administrator much easier as well as more enjoyable.

The "job description" used in hiring a staff member may include a section on facility planning and staff member involvement.

One might ask or question if staff should be involved in the planning of equipment and facilities. From personal experience, I'd say, they are invaluable. There is an old saying that two heads are better than one.

I'm reminded of a salesman who stopped to chat with a farmer. Leaning across the fence, the salesman said, "Corn looks kinda yellow."

The farmer replied, "Yup! I planted the yellow kind."

The salesman tried again. "Looks like you're only gonna get half a crop."

"Yup!" the farmer said, "the landlord gets the other half."

Irritated by the farmer's wit, the salesman snapped, "You're not far from a fool, are you?"

"Nope," said the farmer, "just across the fence."

This familiar anecdote may bring a chuckle but it stems from some very real barriers to effective communication. We must communicate! We must communicate with our staff. The staff and divergence of interests in planning facilities demand that adequate time be allowed for proper communication and understanding of all conditions and requirements to obtain the desired result. One can never do too much planning or get too many ideas. Many costly errors have been made in the construction of new facilities. It's a lot easier to make changes in the planning stages than when building or after the building is completed.

Staff members bring to their job a wealth of background experiences and ideas. These should be used when planning for new equipment and facilities.

By involving staff members in the planning process they will---

1. Have a feeling of importance or "usefulness" in the planning process.
2. Have thought how they perceive using the new facility and its "workability".
3. Have a greater feeling of pride when the project is completed knowing that they have been involved.

The administrator by involving staff in facilities planning will---

1. Have created a pool of creative ideas and thoughts to draw from during the planning process.
2. Have a staff that understands the problems and restrictions of construction; therefore less administrative criticism.
3. Have promoted the team approach to management with better staff feelings toward the project.

Depending on the type of school, organization of staff, etc. staff involvement can also mean involving such others as department heads, custodial, and secretarial staffs. It is wise to consult with these various people as well.

Each building process will vary, but the following is a number of steps that might be used in the planning process.

Step I - A meeting should be held at the onstart to lay out the general plan for the facility and to set up a timetable (assuming this has not already been done). Each staff member should be asked to consider his area of expertise and develop what he considers his needs. Each staff member at this point should be encouraged to "dream a little" and propose an ideal. The staff members should also be given the chance to make a "want list" of equipment and where it might be located. You can help your staff in this process by providing catalogs, brochures, etc. from which they might get ideas.

Step II - At a subsequent meeting this information should be gathered from the staff members. You as the administrator might consolidate and put this information into a workable plan.

Step IIA - Another course of action might be that you'd present data gathered to the architect. In addition architects should be informed regarding the programs, method of instructions used, and other special needs requirements. Many architects do not fully understand the requirements of providing effective education.

Step III - Preliminary architects plans should be reviewed either with or without staff depending on time, completeness of first drawings, etc. At some stage, staff members should be brought in for consultation. Scale models such as I have here can be made and moved around on the plan to see how various arrangements look. Proper arrangement provides an attractive area which stimulates interest and facilitates development of desirable abilities. Translucent drawing paper laid over the top of the plans is also helpful in scribbling proposed changes. Staff are invaluable in looking over the architect's plans. They can help in the placement of electrical outlets, heating, electrical, water, and air lines etc. Staff should be involved through the final planning stages.

Step IV - Input from staff is invaluable when planning equipment purchases. In fact, I've found staff members can do a great job of writing specs for equipment to be purchased. They are the ones who know what they would like or need. Equipment shouldn't be purchased unless it fulfills a need, but an instructor must have adequate equipment to provide effective instruction. Budgets may limit getting all the equipment desired immediately.

I might add just a word on staff motivation in facility and equipment planning. Involvement of the staff does provide motivation. The staff will be concerned that a well planned facility is built and that it is efficiently equipped. All in all, staff can and should be involved as much as possible in the planning and equipping of a new facility.

Funding - Always a Challenge

Staff Involvement in Planning

Phillip Martinson

Reaction to remarks made by Donald Ahrens

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Mr. Ahrens analyzed well the need for staff involvement in planning for equipment and facilities. Their input is imperative since they become the users in the educational program. I would like to add a couple of my own comments which will reinforce Mr. Ahrens presentation.

Several years ago I was involved in the planning and building of a farm power facility at my own college. Equipment was also purchased at this time. The advisory committee, made up of dealers and service personnel, became our most valuable source of information. Even with all this planning some mistakes were made which are nearly impossible to correct today without a major revision of the existing facility. For example, entrance doors were designed to handle equipment of that era of time and today we find that some tractors cannot be brought into our shop. Equipment purchases do not become dated as soon as the facilities, but one must keep in mind that these must constantly be updated. Staff and supervisors must be constantly alert to changing equipment and technical data.

A serious look at site planning in relationship to easy access and aesthetics are a must for educational facilities. Staff can help a great deal when it comes to easy access. They must have input since they are the ones who must load and unload equipment in all types of weather. Movement of the machinery, whether loaded or transported, must be reviewed. Watch for overhead obstructions, both in the movement area and assembly areas. Aesthetics are sometimes a forgotten element in the planning. The view must be pleasing to the customer, in this case the student, since first impressions may make a difference as to whether the public thinks you have a good educational program.

My last comment is take time. Take time to let your staff and supervisors plan and visit other facilities. Look not only at educational facilities but dealerships which have been constructed in the last few years.

FUTURE CHALLENGES AND OPPORTUNITIES

(Session Chairman—Louis Hathawy)

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"I truly believe that you have developed the model partnership for industry and education that will be used for many years to come. . . "

William Schreck
Head Consultant
State of Illinois Staff Ag Occupations
Springfield, IL

FUTURE CHALLENGES AND OPPORTUNITIES

"WHAT IS IN STORE FROM INDUSTRY"

R. D. Wismer

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Over a hundred years ago someone seriously suggested that the Patent Office should be closed, since all the good ideas had already been patented. Obviously, a lot of good ideas have come along since then and innovation and technology changes are as much a part of agriculture as any part of American society.

Technology change in the agricultural machinery industry is influenced by a number of forces, but particularly by energy, economics, and electronics. It is appropriate to examine the effect these three will have on future farm machines and the resulting impact on the people who use, sell, and service those machines.

The problems in energy, worldwide, are first and foremost related to petroleum supplies in general and the portable fuels derived therefrom specifically. The future of Deere is bounded by the kinds and amounts of portable fuels available to our customers and by the fuel requirements of our engines. Throughout our Company's history, we have produced engines to operate on fuels readily available to our customers: kerosene, tractor fuel, gasoline, LPG and diesel fuel. During the past 20 years we have found the diesel engine the most efficient practical mobile power source for ground vehicles. Deere has capitalized on this efficiency and the match of diesel engine power output characteristics to the jobs required of agricultural and industrial machinery to become a major manufacturer of diesel engines. We believe that the diesel engine will remain the dominant power source of our machines for the rest of this century. Our projections of future portable fuels indicate that diesel fuel will be available in sufficient quantities to ensure this; however, the combustion quality of diesel fuel will be lower.

During this period we will see the development of fuels derived from agricultural products and residues. They are expected to have an impact in certain regions on the engines in our customers' equipment. This is a fact that Deere and other manufacturers of engines for agricultural and industrial equipment must plan for. Thus, we will probably see the conventional high-speed, reciprocating diesel engine joined by other engines such as the stratified charge-spark ignited reciprocating, rotary, and gas turbine.

All of these developments will involve considerable change in the technology of engines. Raising the temperature inside the combustion chamber is the most productive way to increase an engine's efficiency, but conventional materials, like cast iron and aluminum, are already operating at their temperature limits. So, new materials like ceramics will be used in future engines to insulate the combustion chamber. At present, these techniques are being tried in some demonstration engines for military vehicles.

At this time we don't know the service techniques that will be required for the engines of the future, but we anticipate significant changes in tuning, diagnosis, and repair. The timing and duration of fuel injection can be adjusted to give best fuel efficiency for a particular engine speed and load. The same thing is currently done with spark timing in gasoline automobile engines. But, as in those gasoline engines, it will be done electronically rather than mechanically. The complexity and cost of a mechanical system that could respond to engine speed, load, air temperature, manifold pressure, and coolant temperature would make it impractical.

Although electronic systems have greater capacity and reliability than mechanical systems, they are harder to troubleshoot with the unaided eye. Future service technicians will use a number of diagnostic aids to identify faulty components. The aids will be designed by the manufacturer either to be general purpose or specific for each particular system. It is fast becoming essential that technicians feel at home with electronic service equipment, even to the extent of programming the diagnostic aid. Programming may be by key selection or by typed instructional statements.

The need for more productive and fuel efficient farm machines is producing increased

sophistication in machine controls. Providing a large number of closely spaced gear ratios allows matching implement load and engine torque over a wide range of speeds. On-the-go shifting over the entire range of ratios requires a planetary design. Put all these requirements together and you have the 15-speed power shift transmission we just introduced on our 50-Series Row-Crop Tractors. Troubleshooting this transmission requires understanding planetary gear sets and basic hydraulics.

It isn't hard to imagine an integrated engine-transmission system with a control system programmed to select the best engine speed and gear ratio automatically, and perhaps controlling the three-point hitch as well. Such a system will be introduced when it becomes cost-effective to the farmer. Deere already has such a controller on an earthmoving scraper. There is also a diagnostic box that can locate problems in the controller or transmission. The controller itself can also diagnose some problems and tell the operator if it is safe to continue operating or not.

The common theme of all these examples is that electronics will be the brain and hydraulics the muscle of future farm machines. Increasingly, the electronics will be in the form of digital microprocessors. The technician, who services these machines, must be trained in electronics, computers, and hydraulics to properly diagnose and repair them.

Another trend in farm machines is toward modular design. This involves the use of major components such as engines, transmissions, axles, operator stations, etc., on a wide range of machines. Because of the commonality among machines and the way they are integrated into the machines, it will be relatively easy to exchange the entire component like a heart transplant, rather than repair it in place, as in a heart bypass. Component exchange will require the dealer service personnel only to identify the faulty component, using the diagnostic equipment mentioned earlier, and make the exchange. Trained specialists serving large areas will repair the components for reuse at a later time. Accurate diagnosis of failures requiring replacement becomes extremely critical in this case because of the downtime and cost associated with major component replacement. This concept is already well established for automobile accessories such as starters, alternators, and airconditioning compressors. Some engine manufacturers have such programs for complete engines.

Economic forces will cause farm size to continue to grow. Thin profit margins mean that farmers will need high sales volumes to generate a desirable net income. They will need larger machines to produce these high volumes with a minimum amount of labor. The farmer can make the best use of these large machines if on-board monitors and controls remove some of the load from the operator and let him devote his attention to jobs that cannot be automated. Planter monitors are probably the most sophisticated example on the farm market today. Some even have a radar system to measure true ground speed. Combine loss monitors will become more accurate in the future. Row followers for guidance assist are already in production, and will be more widely adopted. All these are electronic systems, needing diagnostic skills not widely available today.

I spoke of ceramics as an example of a new material in farm machinery. There will be others, wherever they can increase the capability of a machine or reduce its cost. Graphite fiber reinforced composites have moved from the aerospace industry to Detroit. They probably will find a place in farm machinery. A number of plastics are being used today where low friction, corrosion resistance, transparency, or fabrication process has an advantage. Repairs will be quite different than metal parts. Our service departments had to learn to repair fiberglass seed hoppers on planters a few years ago. These new materials will also require new techniques.

To summarize, we will see continuing adoption of new technology in our agricultural machines of the 80's and 90's. This will result in increased sophistication and complexity of these machines but must be accompanied by increased reliability and uptime. We have historically considered increased complexity and increased reliability to be opposing trends. It need not be so. Unnecessary complexity does reduce reliability, but the productivity of modern farm machines was based upon the adoption of new technical developments; for example, direct injected diesel engines, hydraulic power, turbocharging, powershift transmissions, the Sound-Gard body, etc. All have been more complex than the components they replaced but all have ultimately increased reliability and uptime as well as productivity. The secret of "having your cake and eating it too" is the management of technology. It begins with basic understanding in the laboratory, progresses through engineering design and development, and ends with field service of the product. The latter is the subject of this conference.

It is obvious to us all that the service technician/mechanic plays a vital role in the successful introduction of new technology to farm machines. This role is going to be more critical and dynamic in the future as the rate of adoption of new technology increases. Although we can identify many of the specific technical capabilities that technicians will require in the 80's and even the 90's, we cannot possibly identify them all. Electronics, computer systems, including microprocessors and software programming, and new materials will be included to be sure, but what after these? Your technician graduates will have working lives exceeding 40 years. There is no way that we can identify with acceptable

accuracy the technology change that will occur during that long a period of time. Thus it is essential that the formal training of service technicians instill both the ability and the desire to continue to learn after they leave school. This will increase their receptivity and ability to adopt new technologies as they develop. I am aware this complicates your problem as educators in deciding between teaching principles and teaching practice. But I am convinced there is an optimum compromise and that with time it will trend more to principles.

FUTURE CHALLENGES AND OPPORTUNITIES

Reactors' Panel Response

Roland F. Espenschied

Reaction to Remarks by Robert Wismer, "What's in Store from Industry?"

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Mr. Wismer indicates that energy, economics, and electronics will have a major effect on future farm machines and those who service, sell and use this equipment.

Diagnosis will have great importance in the future and sophisticated diagnostic aids will be utilized. Correct diagnosis will depend on intelligent utilization of this equipment. This will require technicians that are well trained in basics of electrical and hydraulic circuits.

Mr. Wismer refers to large component exchange just as alternators, coolant and diesel injector pumps are exchanged today. The costs of these major components will be very great, compared to the cost of minor components such as an alternator so an error in diagnosis could be very costly.

He also mentioned new products such as graphite fiber that will be utilized in farm equipment.

These new products and techniques will increase reliability even though the equipment is more complex. The modern automobile engine is a good example of increased reliability. Today's engine is a 150,000 mile engine while an engine built in 1960 was considered good for half that number of miles and the 1980 engine is far more complex.

The challenge for technicians and their teachers is clear. We must teach these technicians to master these new developments and instill in the teachers a desire to continue to learn and to stay abreast of new developments. We must develop a thirst for knowledge and encourage in our students a fascination with the challenges of the future and a desire to meet and master these intellectual challenges. Our job must be to teach basic principles coupled with a confidence and spirit of adventure that will help them meet whatever problems the future presents.

Industry(one-partner) and Education (another partner) need one active partner--the technician to do the job for the American Farmer. We, as teachers, agricultural engineers and ag educators must give Deere & Co. credit for serving as a catalyst to "pull it off" as John Conrads said but if we don't train technicians to meet these challenges, we will all have failed.

Our students will reflect our attitudes, our work ethics, our idiosyncracies as the challenge to us as teachers is truly awesome!

FUTURE CHALLENGES AND OPPORTUNITIES

WHAT IS IN STORE FROM INDUSTRY?

LOUIS HATHAWAY

Reaction to Remarks Made by Robert Wismer

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During Mr. Wismer's presentation he told you about some changes in technology that will offer new challenges to the ag machinery instructor, student and technician.

Mr. Wismer was not guessing at what some of those new technologies will be; they are already in their infancy. Some are not new to other fields but will be new to agricultural machinery.

For example, the engines he mentioned are in existence today in other types of equipment, but may require even more modification to fit the needs of farm equipment. The new "exotic" materials required to make these engines perform efficiently will require the technician to learn new knowledge and skills that haven't been developed yet. With these new technologies, the student and technician will be faced with whole new concepts that will require more than a "nuts-and-bolts" approach to understand and repair such designs.

Even now the successful technician must be a willing student, who continually wants to read and learn everything there is to know about operation, diagnosis, and repair of today's complex equipment. But tomorrow's technician will think our modern equipment is simple compared to the computer controlled electronic systems that will be required to monitor engines made with ceramics or even plastics. Added to this complexity will be a very sophisticated hydraulic system and transmission, both which will also depend on computer programming and electronic devices to operate properly.

All this new technology will require students who are not only good with their hands, but good with their minds. To become one of these future technicians will require that the student and technician have as much education and training as possible on a continuing basis. The desire and ability to be an ongoing scholar of technology are not attributes that are just preferable virtues to have, but traits that all technicians must have to succeed. No longer can the student technician be weak in academic studies. And these new technologies will require a great deal more study, classroom instruction and hands-on experiences than presently required.

The ability to accurately diagnose failures will become more important as equipment gets more complex and expensive. As Mr. Wismer pointed out, modular design for component exchange may become common; and mistakes in diagnosis will be more expensive. Diagnostics cannot be trial and error propositions, but must follow logical and orderly steps to find the causes of failures efficiently and accurately.

Preparing for the future needs of the student technician is going to require ongoing effort by industry and education. If we don't meet that challenge with all our effort, the already challenged technician will suffer "technology trauma." In the future the volume of knowledge that the individual will have to learn may be overwhelming if education fails to recognize industry's need for technician graduates who are well educated in technology.

The person who has chosen the career of an ag machinery technician must also be highly motivated. As Mr. Wismer said, "... it is essential that the formal training of service technicians instill both the ability and the desire to continue to learn after they leave school."

Future Challenges And Opportunities

How Are Educators Going To Cope With The Future?

Dr. Ronald F. Williams

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During the past three days, we have shared our successes and failures in developing a sound relationship between education, and the nation's ag mechanization industry. Frankly, I am very concerned about that relationship. My colleagues in education talk endlessly of the quality of the product we are producing, yet each year John Deere and companies of like stature increase the amount of money they budget for in-house educational programs, and in the meantime proprietary schools, such as DeVry Institute, and others compete with the public community colleges for enrollees. If we in the public sector, of technical education, are doing such a great job, why do these conditions exist?

This opening statement is not to demean the efforts that all of us in education are making and have been making over the years to meet the needs of business and industry, because we can all point to our successes. However, it is my thesis that our successes of the past will not suffice in the future. The rapidity of change is forcing major readjustments in the industrial/education relationship.

Ladies and gentlemen, the very future of our country is at stake, and the grass roots relationship between industry and education will determine the future industrial and business success of our country.

Let me give you a few examples which have prompted my serious concern for the future.

A. 56% of the money available for industrial loans in the U.S. is being grabbed by the federal government to offset the balance of payments debt, and it grows daily.

B. The only sustaining export the U.S. retains is agricultural products, we are now importing most other manufactured products, and many raw materials. This is the status that most 3rd world countries exist upon today. Is it possible that by the year 2000 the U.S. could be functioning in the same economic climate as many of the 3rd world countries exist today?

C. One Japanese auto maker has more robotic implements in operation today than all those in operation in U.S. companies.

D. When the U.S. public thinks of quality automobiles, in spite of Ford's quality #1 advertising campaign, most people today think Japanese or German.

E. In many European countries, retraining employees is a normal process. Wages are guaranteed during the retraining period. In the U.S., welfare and unemployment compensation is paid for idle time. In fact, in the State of Illinois those receiving unemployment compensation may not attend college full time (i.e., 12 credit hours) or they lose unemployment compensation. Yet our political leaders speak of reindustrialization and retraining the idle work force for new high technology positions.

F. Many speakers and authors are raising questions of reindustrialization, yet no national policy exists.

G. As a result of the downturn in the economy, and lowering prestige for education at the national level, many states have been forced to reduce funds to community colleges and technical schools. This at exactly the time when stronger efforts need to be made to enhance technical education development.

H. As a result of the economic downturn, support both financial and in terms of equipment, donations from industries to educational institutions have dropped dramatically.

I. For the jobs that exist today, we have too many workers and for the jobs of tomorrow, we have a lack of workers.

J. At a recent farm progress show a new computer controlled combine got a lot of attention - foreign built, of course.

K. John Deere's new combines included computer chips used in control functions. Yet most technical school instructors have no experience in operation or service of this equipment, and no way to get that instruction.

L. A recent statement by Henry Ford as he retired as chairman of Ford Motor Company seems to identify the feelings typical of many industrial leaders, "We built poor quality cars during a period of prosperty and it was evident to the public."

Recently I asked one of my ag mechanics faculty members how we were to cope with the explosion of electronic and computer technology, his response was "We won't, we can't, unless industry and colleges get much closer together."

Across this country are 1400 plus two-year community colleges and public technical institutions. This means that on the average, 27 such colleges per state are in need of stronger relationships with local implement dealers and home based companies.

In many ways it is a frightening picture that we face, however, I believe that if our country is to survive this rapidly changing technology, then we educators must stick our noses out and lead. I would like to offer a few specific suggestions to begin progress toward a closer relationship with industry, and the technology it is breeding.

I. First, we in education need to get our own act together. In many cases our credibility with industry is very shaky. There is much to be done, curriculum outlines need to be reviewed and courses brought up-to-date with current state of the art technology. We need to become students ourselves and researchers of the future technology. We need to really assess the quality of our product for the existing market and make changes where necessary.

It is important that we stop making excuses for our product based upon what state agencies will allow in terms of curriculum. If necessary, we need to take action to change the policies and procedures of those agencies, and I believe we have the support of our corporate leaders to do so when necessary.

We need to become much more concerned about keeping ourselves up-to-date. Colleges must provide opportunities for staff to upgrade their training, and the teaching staff must take the initiative to pursue these opportunities.

As instructors and division directors, you must increase communications with your president. I know a lot of community college presidents and have yet to find one who could not be educated, yet they have a lot of pressures on them, and only persistent and reliable efforts in educating them will bring results. They need to know your needs for budgetary support, for staff development, and equipment needs. They need this communication to be specific, something they can get a hold of but also something not set in concrete.

II. There is much more to be done to get our house in order, but assuming we get at that job, we then must increase our efforts with local implement dealers and home base companies.

Companies need to designate one office or person as an education liaison. Too often educators are reluctant to pursue their needs and desires with industry because they do not know with whom to deal. (Ex. - East - Tractors)

Educators must get to know their local industry people better than we have in the past. We all can cite our success with vocational advisory committees, yet we must go beyond these committees to others within industry and business. In short, we must be much more aggressive in communicating with our partners in industry, and this should be done at all levels.

III. We as educators must also get off the fence and support those political figures who espouse a philosophy of improved working relationships between education and industry. We need to question political figures regarding their knowledge of the community and technical colleges and their potential in the reindustrialization of America.

And we need to change those bureaucratic agencies that control curriculum development and financial support that affects our ability to tool up to take on future challenges.

During this presentation, I have tried to point to some of the changes that our nation is going through, some of the challenges for the educational community, and offer, a few and only a few suggestions for us all as we cope with the future.

In closing, I need to tell you I am frightened by the future for all of us, yet as my adrenalin increases to meet the challenges, I am confident we will be able to meet the future because we now recognize the mutual needs of both industry and education. (Ex. - NEA ads showing unprepared children trying to deal with

advanced technology.)

I am encouraged because there is a reawakening that we as educators have a major role to play in meeting the future needs of our nation. And I for one believe we are capable of meeting that challenge.

FUTURE CHALLENGES AND OPPORTUNITIES

Reactor's Panel Response

Roland F. Espenschied

Reaction to Remarks by Ron Williams, "How are educators going to cope with the future?"

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In responding to Mr. Williams remarks there are some areas in which we agree and others in which there is some disagreement.

In setting the stage for his presentation, Mr. Williams refers to robots in Japan. We must remember the labor climate in this context!! What sort of encouragement for robots do you suppose the United Auto Workers gives industry? He mentions the quality of Japanese and German automobiles. It is American labor that assemble our automobiles and few laborers have had any pride in the finished product or any sense of obligation to turn out a quality product. He mentions retraining of employees. Retraining an indifferent employee is quite likely to result in a retrained, indifferent employee. Perhaps we as educators should take some blame for these problems but it is the absence of a "work ethic" that underlies most of these problems.

The problem of reduced funds at community colleges is not a problem that is unique to the community colleges and it is a situation that will probably continue for some time (at least in Illinois).

Suggestions for closer relationships are continuing evaluation steps that we should all follow with our educational programs.

In general, I believe that all companies have a contact office (liason person) to whom educational requests should be forwarded. In Illinois, the Statewide Ag. Mechanics Advisory Committee is a good place to make those contacts.

Support of political figures sympathetic to education-industry partnership may be a good idea but I hesitate to react to that activity proposal.

I would suggest that membership and active participation in professional groups is a way of staying up to date, of making industry contacts and improving instruction. I am referring to Amer. Voc. Ass'n, Amer. Soc. of Agr. Engineers, Voc. Ag. Teachers Ass'n. and Amer. Diesel Society to mention a few.

To the teachers present, "Show your administrators what you have gained from the conference, Society meeting etc.". Put these new ideas into practice to reinforce the value of the membership.

In summary, I feel that we, the service partners education and industry must never lose sight of the continuing needs of the third partners, the technicians. These men and women must be helped to become the best citizens they can be, to work at a job, to serve their communities, churches and schools and raise their families and continuing education will guarantee that they will be useful productive members of the partnership.

FUTURE CHALLENGES AND OPPORTUNITIES

HOW ARE EDUCATORS GOING TO COPE WITH THE FUTURE?

LOUIS HATHAWAY

Reaction to Remarks Made by Ron Williams

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In his presentation Ron Williams gave us some insight to several external and internal factors that will affect education of the technician. Many of his remarks related to economic concerns and the relationship education has with industry.

He said, "...I am frightened by the future for all of us..." He is not alone in his fear. Many of us here today share this fear. But, it is a healthy emotion in this case because it causes us to go into action...to do something about it, to attend this conference, for example.

Mr. Williams also said that educators need to assess the quality of their graduates and make changes where necessary to improve that product. He also said, "If necessary, we need to take action to change the policies and procedures of those agencies..." that affect the quality of the curriculum.

Mr. Williams' points are well made. It amazes me that we expect a student technician to learn in two years all the basics that many don't learn in four years. Is our educational system constrained by peremptory rules that prevent an adequate education of the technician? It is one thing to say that thou shalt not require more than two years of education to become a technician. It is another to say that two years may not be enough to produce consistently good quality graduates who can confidently perform at the entry level required. Twenty years ago, two years of education may have been adequate for that technician, but the technology we have today and will have tomorrow demands more.

Technology is a rapidly growing knowledge and development base. It cannot be correlated with a pure academic curriculum such as liberal arts where the knowledge base is not rapidly changing.

We, as educators and industry, cannot afford to let tradition stand in the way of progress. For many student technicians, two years of technical school (postsecondary level) is not enough. And if this is true, we are not gearing the educational system for the average student so that we can achieve our objectives. Whether it takes three years or better instructional methods, it appears that the average student is not achieving our goals.

We have had experiences that lead us to believe that the technician is not getting an adequate education. Monday, for example, Mr. Robert Sohl, Deere & Company Director of Service, told you of problems indicative of such lack of knowledge and skills. He showed you the number of returns of "no fault" components. A high percentage of returned components had nothing wrong with them, but the technician thought so. This kind of error in judgement indicates that the technician was using trial and error methods rather than sound diagnostic principles to determine component failures. If the technician is not performing adequately because of education, it is not the fault of that individual...it is ours, education and industry.

How can we meet these challenges of the present and future?

Ron Williams said that educators must increase their efforts by working with industry, by reviewing curriculum outlines and by bringing courses up-to-date with current technology while anticipating future technological changes. He also said, "we need to change those bureaucratic agencies that control curriculum development and financial support that affects our ability to tool up to take on future challenges."

I believe industry is ready to do its part; apparently, you as educators are willing also. The challenge has been thrust upon us, let's meet that challenge with enthusiasm! We can succeed as Partners in Ag Mechanization.

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INDUSTRY AND EDUCATION...PARTNERS IN AG MECHANIZATION

OBSERVATIONS

WILLIAM A. DOERR

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I have been asked to make observations of the conference as an educator. I am only one of several educators here and my report may differ from the report that other educators would make as much as the difference in the reports of the blind men who went to observe the elephant and each reported his impression of what an elephant was like.

As printed in the program, I am to review the conference-- its success and its significance. There are several successes; the most obvious of which is the overall organization and plan of the conference. The selection of the participants provided an excellent blend of personnel to bring various view points and to have an exchange of ideas. The topics were most timely; the administration of the program, the carrying out of the plan was quite precise--the committee proved that the plan, as it had been prepared, was workable; John Deere was an excellent host--perhaps the meals were a bit overly generous in calorie content but they were gastronomical delights and one additional indication of the genial hospitality of Deere and Company. Obviously these successes didn't just happen. Our thanks go to Lou Hathaway and to his conference planning committee. Also our thanks to Deere and Company for the financial and personnel support given to this conference. The financial support was major but I think the amount of personnel backing that was given is even more significant. Last evening at dinner someone joked that the reason the corporate officials were at the dinner was to collect part of their administrative perks but we know that the presence of the officials did indicate the level of the importance which Deere and Company has placed on this conference.

And, of course, thanks go to all the participants. The workshops, the reports of the workshop activities, and the reactive format gave many persons an opportunity to participate in the conference and contribute in the overall effectiveness. So I think it would be appropriate at this time to show by applause our appreciation to Lou Hathaway, his committee, to Deere & Company and to all participants.

Now for observations. I can't possibly review all that has occurred at this conference. Fortunately we will have printed proceedings to which we can refer, but the observations that I make will relate to some of the conference objectives.

Some of the objectives were indicated by the early speakers. President Hanson quickly got to industry's objective of the conference by stressing the need, based on increasing use of high technology, for better trained agricultural technicians. John Conrad suggested that the potential of the conference might be comparable to the one small step of the astronaut as he stepped onto the surface of the moon being a great leap for mankind.

As we moved along into the morning program and heard the presentations concerning industry's role in agricultural mechanization I sensed a general agreement or consensus that there is an increasing need for more and better trained technicians. Examples were cited such as an increasing use of electronics; the potential of a "black box" as an integral component of equipment; of hydraulics; of air conditioning; on-board computers; and the diagnostic equipment that will be required to service the more complicated machines.

This increasing need for better trained technicians was further highlighted by the presentation of Robert Wismer just one hour ago when he discussed what was in store for industry-- particularly the use of new materials.

Educators were encouraged to hear industry officials say (1) We have this problem-- a need for better trained technicians; (2) We think public education can help us and we propose to work with you as partners; and (3) This is what we can contribute, itemizing the hardware components, the software, the training sets and the various other educational equipment and supplies.

It was love at first sight and the proposal for marriage was readily accepted but, like other engagements, as we began to discuss prob-

lems equivalent to "who will carry out the garbage", we had our first differences. These differences weren't always between the representatives of industry versus the representatives of public education but were sometimes within one of the respective groups when questions such as: 1. What qualities makes the ideal agricultural mechanization teacher? Should he be a teacher who is also a technician or should he be first of all a technician with much practical experience who then has been invited to be a teacher. 2. Another area of difference of opinion concerns curriculum; what are the goals and the problems? 3. The third point in which some differences of opinion occurred concerned the interfacing of secondary, post-secondary and university educational programs.

As we interacted in the workshops, as we reported to the overall conference the discussion within the workshop groups, and as reactors responded to the presentations there was a sharing of ideas and know-how. We learned what is available; we learned how we can have better cooperation; we learned about possible sources of funding; we learned about the increased need for efficiency in training programs. But more important, we became more specifically aware of the increasing need for better trained ag technicians. We were inspired to a renewed motivation, a greater dedication to our task as we saw the opportunities--opportunities for the persons who will be trained and opportunities for educational institutions and industry to be partners in the training programs.

As we listened to the description of what industry holds in store for the future we could react with either pessimism or optimism. Mr. Tarr, in his presentation last evening, said that we have the challenge of training people who are not qualified for the job that they will have. I respect Mr. Tarr's analysis. That is the kind of speech that makes educators and technicians feel good. In fact, he told educators that they have an impossible task but they can and will do it. They're good. He told technicians that there will never be equally competent persons to replace this generation.

I suppose that is a part of viewing change. I am sure that when the Waterloo tractor was developed, the old teamsters looked at it and said, "Ah, they will never be able to find a technician who can service it." When electricity came to our farms in the late 30's and early 40's many persons looked upon it as an advanced technology that we would not be able to incorporate into rural life. It was decided that perhaps we did need electricity for lights and perhaps it would be nice for mom to have an electric iron and a refrigerator and, oh yes, we would accept an electrically driven water pump--but that was the extent of the use that we could see for electricity on the farm at that time. But look how far it has gone beyond that in recent years!

We're now worring about electronics on farm machinery and the possibility of on-board computers to help monitor the operation of the machine and we're saying "will that be too advanced a technology? can we find men and women who can take care of that machine--repair it and operate it?" We express concern. But let's remember that our young people are growing up in a different environment. Bob Wolff just told me that his nine year old son consistently beats him in playing with the Atari. Children who are growing up now are learning to punch buttons and get information; to see computers control machines. I therefore am optimistic about the ability of the next generation to meet the challenge. Why? Because just as this conference has identified a problem, and has planned a strategy for meeting that problem--in fact multiple strategies--we have also discussed allowing for personal differences. So, I think, young people of the future will be able to adapt to the conditions of their time just as past and present technicians have adapted to theirs.

This morning one of the speakers reminded us that the challenge which we face will require commitment and not "lip service" only. Another person has challenged us not to go home and throw our conference materials in a drawer and forget them and to forget the conference.

The medallion which we were given last evening might be the nicest thing about this conference. It is beautiful! I think it is very symbolic that the plow appears at the top of the art work. Deere and Company has its beginning based upon the first steel plow made by John Deere. The plow also has other symbolic meanings for all of us who have been associated with the Future Farmers of America organization in which the plow is used as the symbol of labor and tillage of the soil.

I think it symbolic that the running deer was not used on the emblem. The running deer could indicate a deer in flight, fleeing from something that has startled it. But the medallion has an alert deer that is observing, is assessing, is evaluating. It will take appropriate action. It is not the running deer that is simply fleeing because it was startled. This medallion can remain on our respective desks as a constant symbolic reminder to remain committed to our respective task as it relates to the training of agricultural technicians for the future.

You may already relate to other symbols. I saw a sign in a window across the street from our hotel: "be all that you can be". Some of you relate to the slogan "to make the best better" Espie will relate to "we're looking for a few good men". Some of you have had experience in FFA and its motto of "Learning to do, doing to learn, earning to live and living to serve." Maybe you relate to "go the extra mile". But let us add one more to these slogans. Let's

remember that "Industry and Education are partners in Agricultural Mechanization."

Again, I commend the committee for the excellent plans which were laid for this conference; and Deere and Company for financial and personnel support. I challenge you, the participants, to keep this medallion on your desk as a constant reminder of your commitment to the partnership which was reaffirmed and redirected at this conference.

INDUSTRY AND EDUCATION ... PARTNERS IN AG MECHANIZATION

CLOSING REMARKS

JOHN A. CONRADS

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Ladies and Gentlemen:

I am pleased to share the platform with Bill Doerr on the success and the significance of this conference. Bill Doerr has already adequately covered the successes that are evident now at this point. He basically addressed the functioning of the conference and the quality of the presentations. I want to talk about long-term success a little bit later on.

So let me, first of all, address the significance of the conference. I'm of the opinion that there were many points covered that were of extreme significance. First of all, it is significant to note that we have pulled this conference off in troubled financial times. We have to thank Deere & Company for making the funds available.

I believe there is significance in the fact that this conference provides visibility to the need for training more young people to become professional Ag-technicians. I believe this was particularly outlined in Fred Thorne's speech this morning.

There is certainly significance in bringing not only industry and educators together, but also in bringing educators to this conference who are from different educational levels and different institutions.

I consider it of great significance that all of us have the courage, and yet the courtesy, to have frank exchanges on the ideas presented. I believe the setting provided for such candor. I believe that without this candor there can't be progress.

There seems to be quite a bit of significance in the recognition that vocational training must find its basis in the grade school. In other words, we cannot afford to teach students how to read and write at the vocational school or junior college level. The Three-Rs have to be taught in third through fifth grades. We must, therefore, exert pressure to improve basic education by demanding that the standards be raised in our grade schools.

There is significance in the recognition that we cannot continue to train people on yesterday's products and expect them to be prepared for future products. This was, I believe, most eloquently demonstrated by Bob Krumwiede. He also indicated that we have to begin a degree of computer orientation training. That doesn't mean that they have to be programmers, but they must possess the skills to access computer information via terminals.

There is significance in the recognition that industry must send clearer signals to the training community on what is expected in job skills of a graduate technician. In other words, industry must tell the educational community what the achievement level of the technician has to be in order to make him effective in the service industry.

There is significance in the recognition that too many employers (dealers) have at best a half-hearted confidence in the worth of a trained technician. This matter needs active involvement by manufacturers to convince dealers that the future technician is not the one that can be "brought along".

There is significance in the recognition that graduates of vocational schools or junior colleges cannot be expected to be fully trained on specific machine makes and models. Therefore, the employer and industry must continue to train the new technician in the specifics.

There is significance in the recognition that dealers have to make an investment in a new vocational school graduate until he or she becomes proficient enough to work at an efficiency level that will return a profit to the employer.

There is significance in the recognition that there is need for much closer communication between the institutions, the employers, and the different industries.

There is significance in the recognition that there is need for reasonable compromises to achieve a more uniform approach to vocational Ag-technicians training. It is, no doubt, good to have a decentralized approach, but it must not stand in the way of effective training programs.

There is significance in the recognition that there is a disparity between the requirements of the job market and the way we educate and train people. Just to give you an idea of what is happening -- presently we are training 40% of our high school students in a 4-year college setting, but the job market only requires 20% college graduates. We are training 20% of our people in vocational schools, but the market is demanding 40%. Obviously that gap has to be closed.

There is significance in the recognition that there must be a closer partnership and an ongoing dialogue between universities, vo-tech schools, junior colleges, secondary schools and grade schools. The activities of each of these educational institutions must dovetail at each level to assure a viable training program for our young people.

Now to the subject of success. Bill Doerr has given you a glimpse of the success of this meeting as we see it right now. I would like to look at the things we must do to ensure long-term success. As Fred Thorne remarked this morning: "Usually when it is all said and done, more has been said than done". We would hope that this would not be true of this conference.

I believe that future success depends on doing small things consistently well. Lee Iaccoca remarked once that it is not nearly as important to do one or two big things a year as it is to do at least one small thing each day.

Success comes by not getting wrapped up in our own little world, but to reach out ... by making necessary adjustments ... by making realistic compromises that lead to workable solutions.

Success comes by being a good ambassador for the cause of vocational Ag-technician training. Perhaps we need to be a bit "dogged" about it. It's been said that it is pretty hard to be efficient without being obnoxious. I don't think we want to try to be obnoxious, but our voice must be heard.

I firmly believe that you will make a difference in your own environment. I know you will be in true partnership with us. We appreciate the time you have spent in this conference. It has enriched our lives.

INDUSTRY AND EDUCATION...PARTNERS IN AG MECHANIZATION

SUMMARY COMMENTS

Donald G. Schwarz

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This has been a wonderful experience and one of the most interesting conferences I have ever attended. It is most pleasing that at this one we focused on vocational/technical level training.

While most of us from education have had some concern about semantics, vocational/technical level training is similar regardless of how it is packaged. It makes no difference if the training is offered through a community college, vocational school, a technical college, a technical school, a vocational institute, a junior college, or a community college. The size, shape, and name of the package is not very significant. The fact that it is vocational/technical training is what counts.

Vocational/technical education at the post-secondary level in agriculture and agribusiness is still an infant. It is at the stage where high school vocational agriculture was in 1932. We are barely 15 years old.

Who are we?

- -We are, in my judgement, a group of educational renegades who focus on training rather than education.
- -We are pro-business. We know that profit is not a four letter word.
- -We are pro-industry.
- -We fill a long overlooked void in the American educational system. Remember Dr. Otto's chart: The technical/vocational and trade training programs of Europe which he illustrated on his chart exist only to a much lesser degree in the United States. We in vocational/technical education are now filling that void and we can learn from the European system.

I am concerned for the future of this vocational/technical infant; concerned that we may be pushed or pulled away from our training focus. I fear we could become just "another step in college prep". I'm concerned that many of our legislators, some of our governing boards, and even some of our colleagues in education want us to move in that direction. Some feel that preparation for college is a major responsibility of vocational/technical education. That cannot be. We must keep our focus on training. We are different from college. We serve a different purpose. In agriculture and agribusiness, university education and vocational/technical training are complimentary. They are not competitive. Neither is "superior" to the other.

We've come a long way in 15 years, but I say we haven't seen anything yet. In the years ahead, our one and two year training programs will continue to grow and prosper. We will see them clarified as quality level job entry training, and will also clarify that they are not "terminal training" programs.

With that thought, I see an even more significant area of training falling to our responsibility. I see business and industry increasing their interest in our training ability. A whole new market will emerge and you and I are going to be part of it. We will see this develop under titles like Outreach Training, Retraining, Upgrade Training, or Contract Training.

Many of you are aware that our Agribusiness Division at Milwaukee Area Technical College is a primary provider of dealership business management training for Allis-Chalmers and also for the Wisconsin Farm Equipment Association. This is training which is completely a partnership arrangement with industry. It is available only to industry, and specifically only to the farm equipment industry. It is an extensive program. It is a successful program. It is a growing program. Yet it's just a scratch on the surface of what lies ahead for vocational/technical training in post-secondary agriculture and agribusiness.

I mention this experience here because I know it can serve as a model for further development of partnership training. I know that some of your schools too have been contacted by similar organizations within agribusiness. It suggests an exciting future:

- -I envision that in the years ahead, our existing one and two year programs which

are now of good quality will get better.

- -I see our retraining and upgrade training programs developing in most vocational/technical schools throughout the country.
- -I see us networking our outreach programs across district, state, and national borders. We are doing this now in our dealership business management training.
- -I see us extending our outreach training beyond the farm equipment industry into several other segments of agriculture and agribusiness.

Why is it going to happen? Why is it happening?

- -Because we can do it better. We focus on training. We produce results.
- -Because businesses and industries are willing to support and purchase quality training which produces results.

In partnership business and industry and vocational/technical training will make this happen.

It is most significant to us that this conference was held. With this conference, Deere & Company, the corporate structure, has recognized vocational/technical education. While many John Deere dealers and field staff have supported us and sought our assistance in the past, through this conference we have been told very directly that this industry wants our partnership. It is a big step for us in vocational/technical education to be recognized in this manner by John Deere, the major force in this industry. I believe that not only John Deere, but the entire agricultural equipment industry, will join this partnership. It's going to be a win/win situation for all of us.

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PLANNING COMMITTEE

In November, 1981, a planning committee was organized to design and develop the 1982 conference. Deere & Company appreciates the time and effort of these people in creating a successful and effective conference. Here are the members of that planning committee:

Rollan Bonneau, Chairman, Ag Division, Kishwaukee Community College, Malta, Illinois

Dean Byerly, Instructor, Farm Implements, Northeast Iowa Technical Institute, Calmar, Iowa

Louis Hathaway, Managing Editor, Service Training, Deere & Company, Moline, Illinois

Larry Hodel, Service Manager, John Deere Company, East Moline, Illinois

Thomas Hoerner, Professor, Ag Engineering and Ag Education, Iowa State University, Ames, Iowa

John Spuller, Manager, Service Training, Deere & Company, Moline, Illinois

Ronald W[illi]ams, President, Black Hawk College, East Campus, Kewanee, Illinois

Robert Wolff, Professor, Ag Education and Mechanization, Southern Illinois University, Carbondale, Illinois

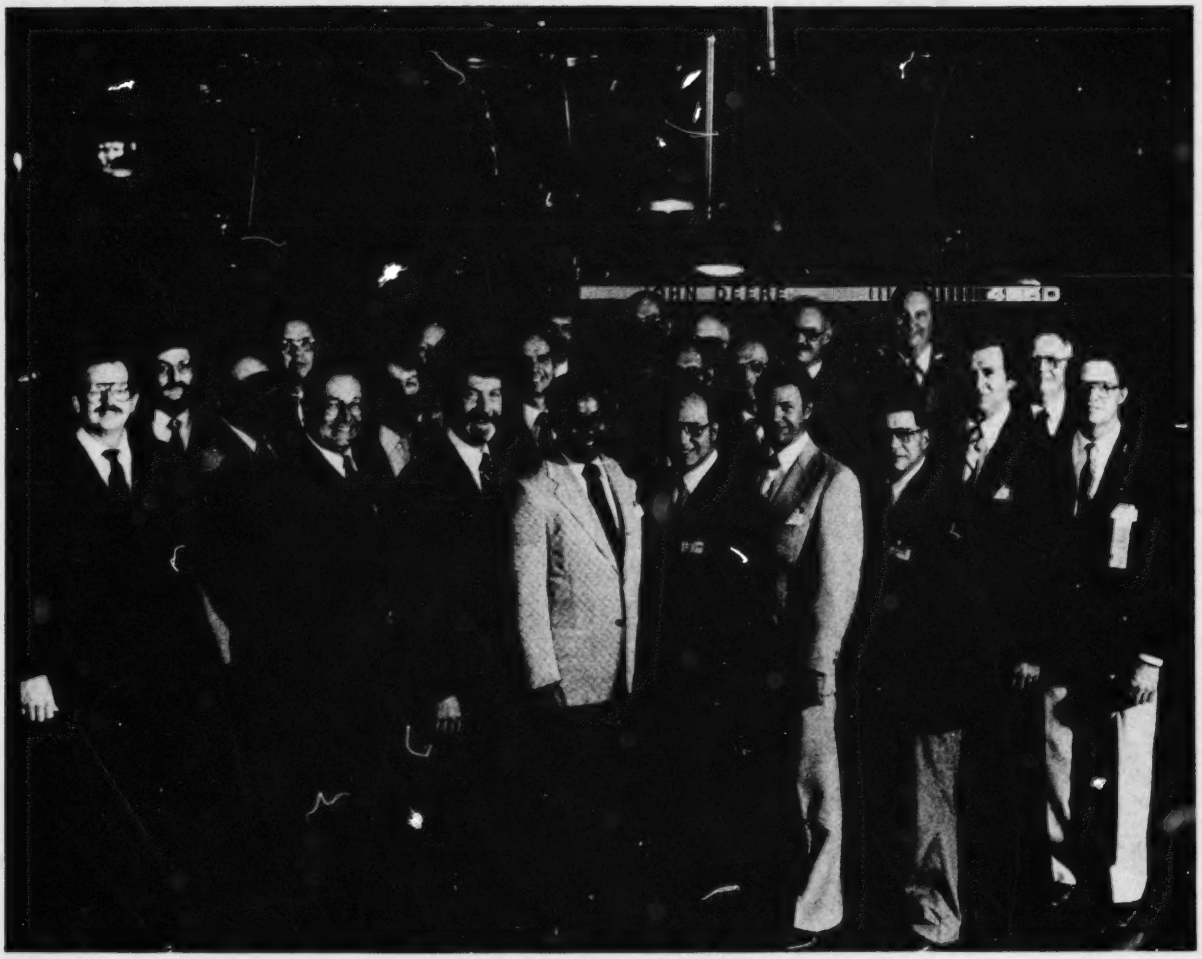
Additional assistance was given by these two gentlemen:

Forrest Bear, Professor, Ag Engineering and Ag Education, University of Minnesota, St. Paul, Minnesota

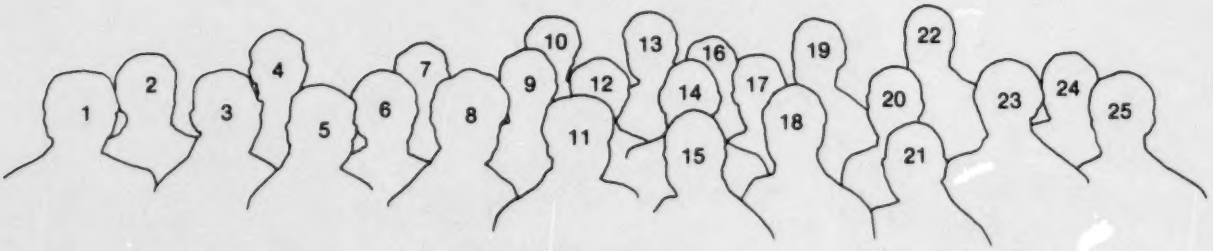
Richard Lindhardt, Associate Professor, Ag Education Department, University of Missouri, Columbia, Missouri

GROUP PHOTOS

On the following pages are photographs of the participants grouped by state affiliation.



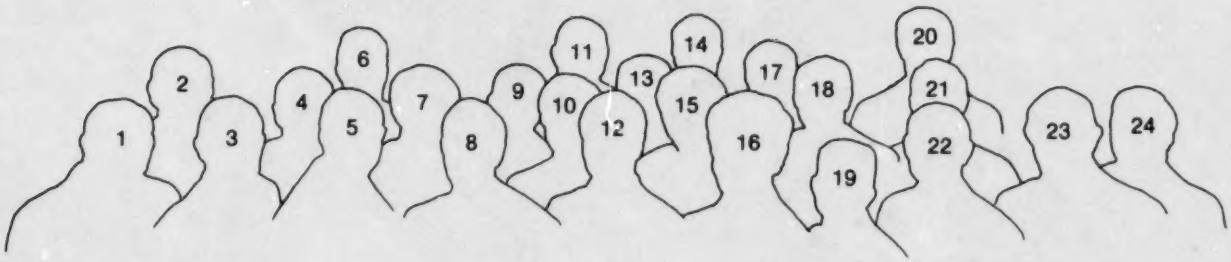
ILLINOIS



1. Steve Johnson
2. Ken Drollinger
3. Dwight Mobley
4. Harold Stogsdill
5. Jim Guilinger
6. Dave Cattron
7. Harold Gates
8. William Schreck
9. Ron Williams
10. David Jones
11. George Shorter
12. Rollan Bonneau
13. Larry Hodel
14. Bene Windsor
15. Ed Breece
16. Bill Doerr
17. Roland Espenscheid
18. Lanny Anderson
19. Harry Hoerner
20. Hubert Helmkamp
21. Eldon Chapman
22. Brian Telander
23. Larry Korte
24. Joe Poulter
25. Bob Wolff

— Larry Munton (not present)

IOWA



1. Ray Nedved
2. Bill Rich
3. Phillip Martinson
4. Harold Swanson
5. Ron Della Croce
6. Dale Parker
7. Ken Ross
8. Dean Byerly
9. Ed Scherich
10. Reed McCulloh
11. Dan Schwitters
12. Vic Bekkum
13. Tom Hoerner
14. Larry Hodel
15. Don Hoover
16. Roger Beck
17. Vic Lundy
18. Don Ahrens
19. Francis Hethcote
20. Douglas Bolen
21. Roger Hansen
22. Jack Bailiff
23. Henry Torkelson
24. Larry Statler

— Harold Crawford (not present)

— Howard Johnson (not present)

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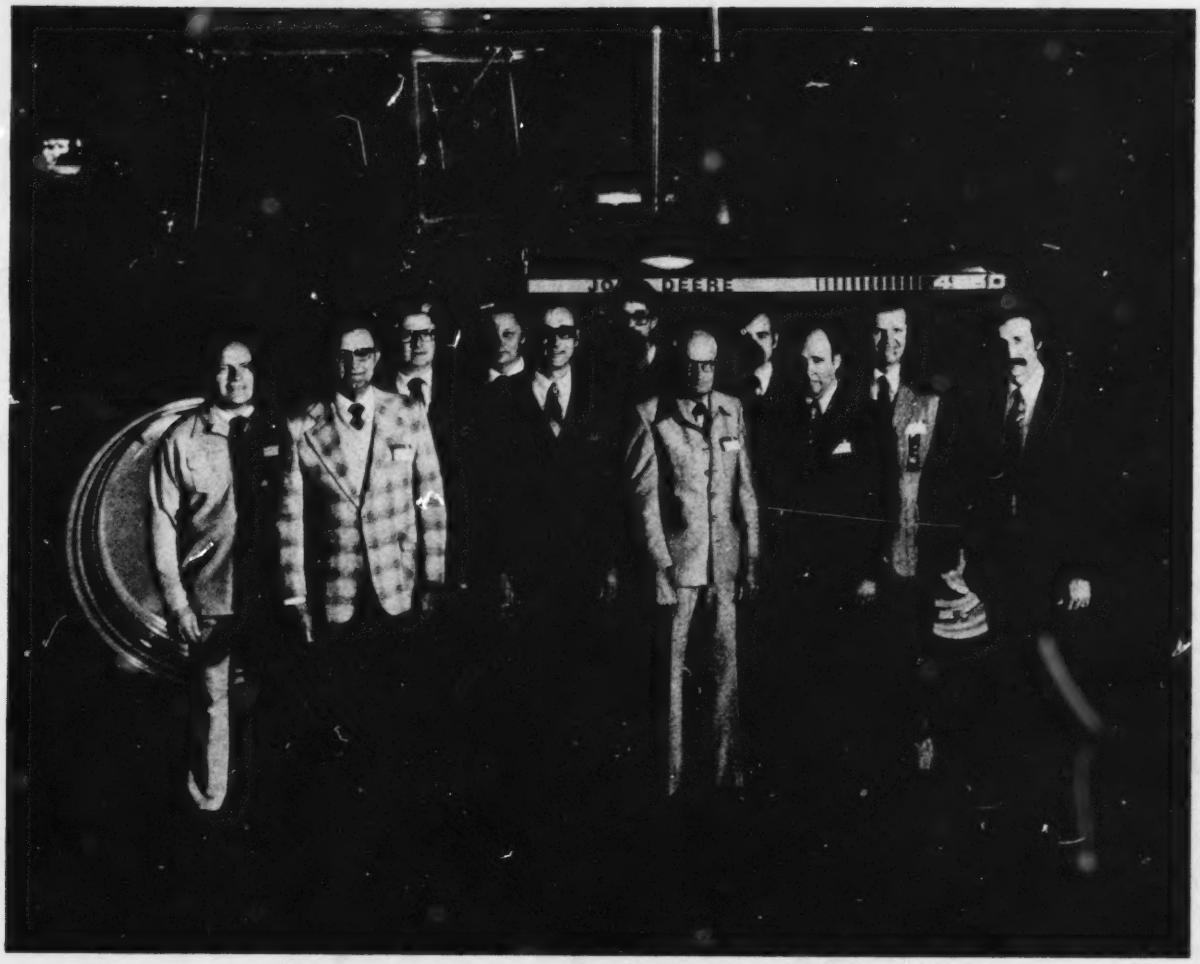
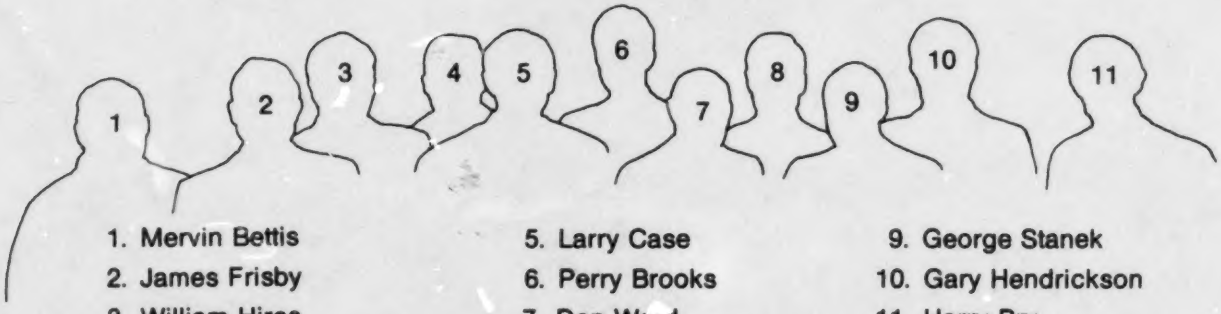
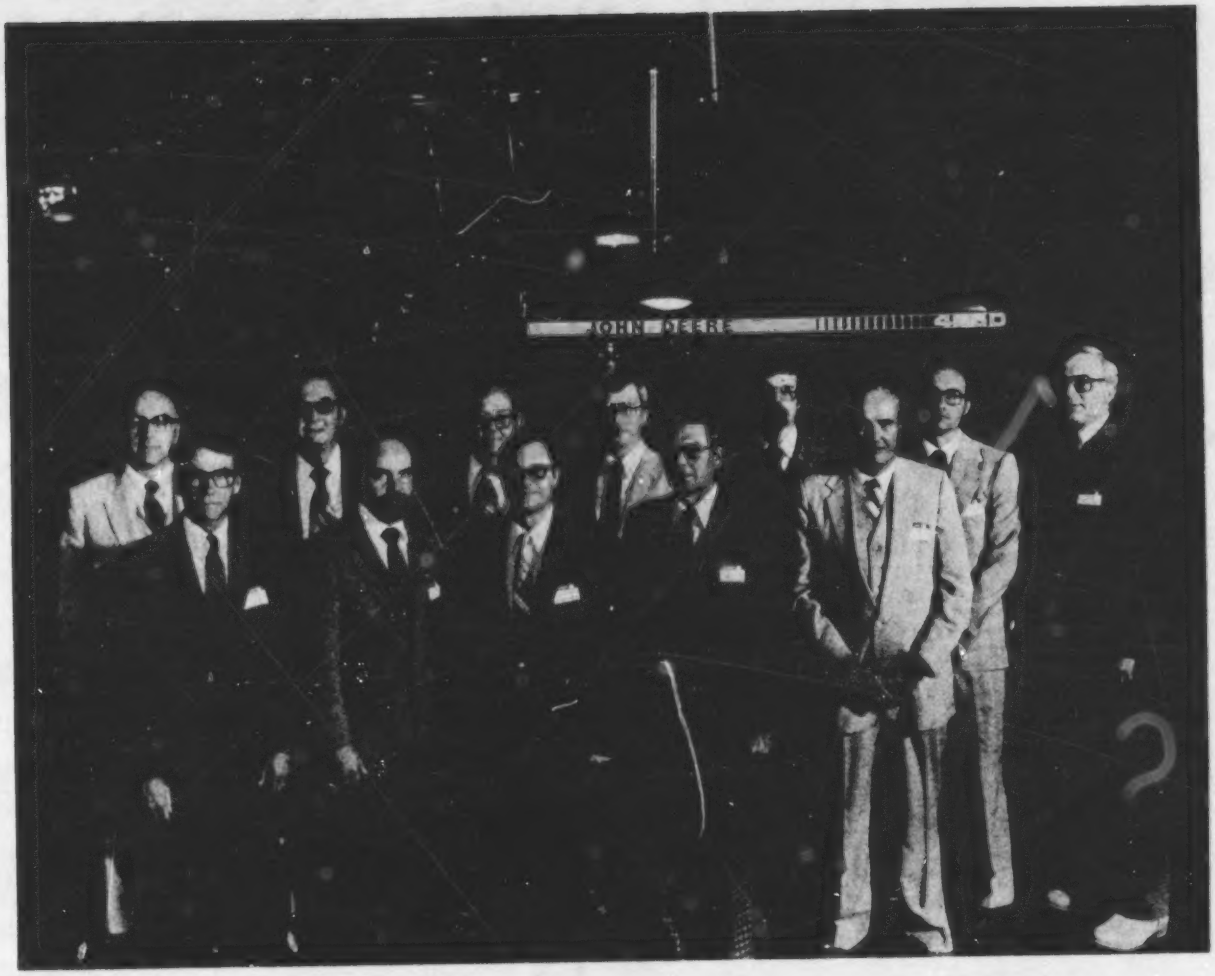
1. William Ryden
2. Paul Aakre
3. Forrest Bear
4. Gary McVey
5. Gordon Jindra
6. Tim Claus
7. Dale Drees
8. Bill Hoffman
9. Kent Freberg
10. John Votca
11. Dale Sanderson
12. Bob Krumwiede
13. William Hohenhaus
14. Phil Lane



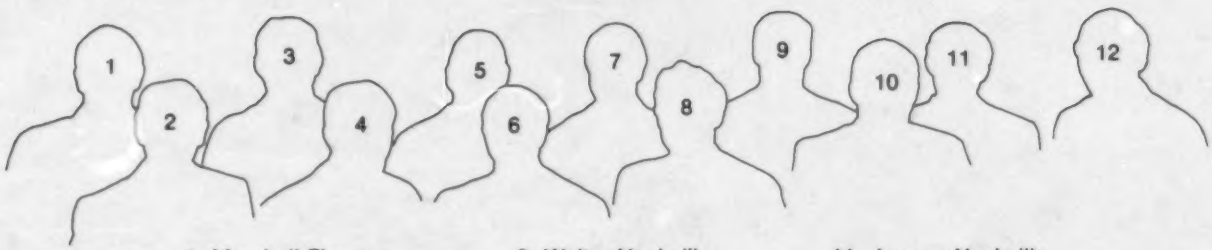
MISSOURI



1. Mervin Bettis
2. James Frisby
3. William Hires
4. Richard Lindhardt
5. Larry Case
6. Perry Brooks
7. Don W[illegible]d
8. Craig Morton
9. George Stanek
10. Gary Hendrickson
11. Harry Pry

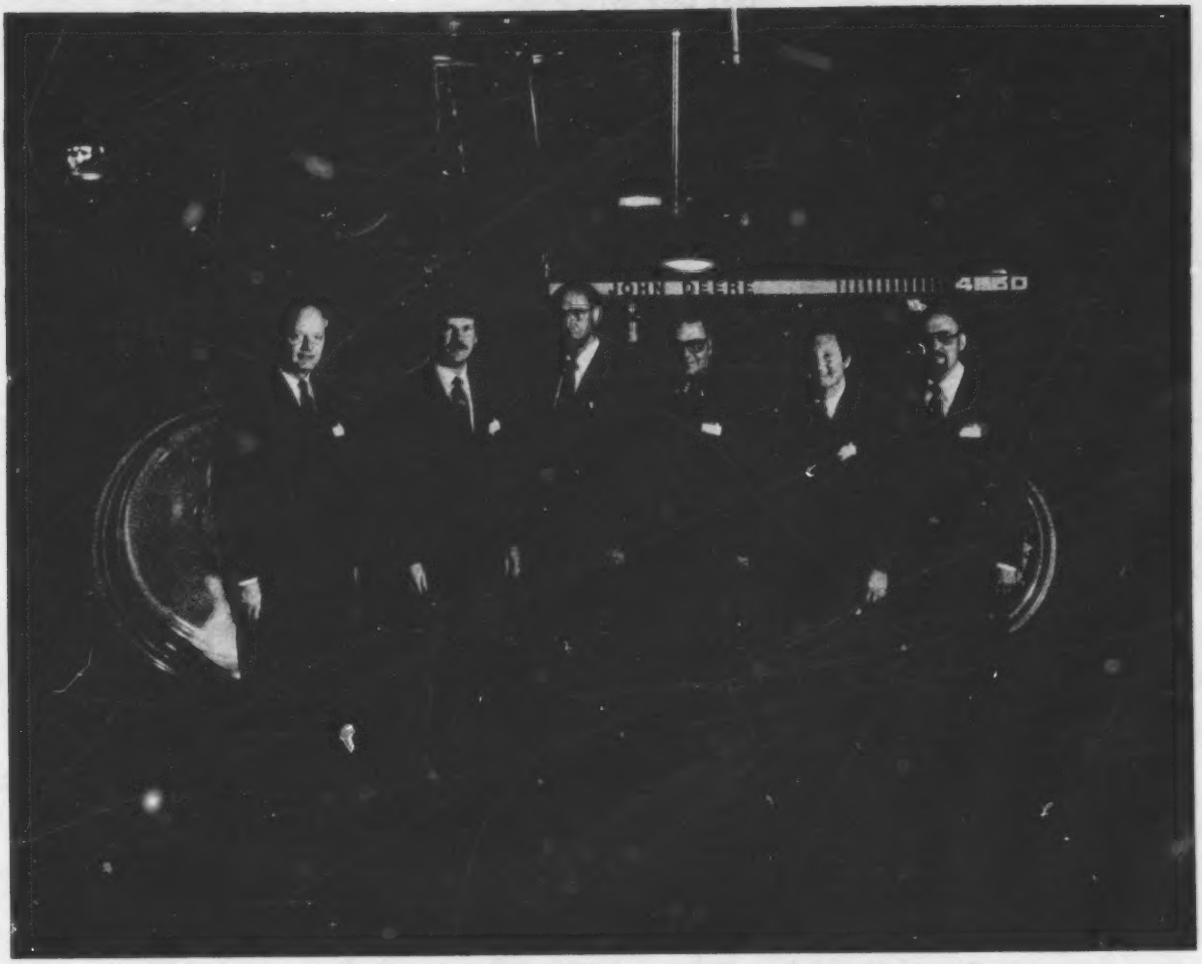


WISCONSIN



1. Marshall Finner
2. Allen Linster
3. Ron Anderson
4. Duane Schindler
5. Ron McNett
6. Walter Nechville
7. Don Schwarz
8. Marvin Case
9. Gerry Vanderloop
10. Richard Loberger
11. Jerome Nechville
12. Paul Rameker

— Cletus Fontaine (not present)



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1. Wilhelm von Schwerin, Germany
2. Brian Hare, Canada
3. F.K. Otto, Germany
4. Alex Palin, Canada
5. John Conrads, U.S.A.
6. Gerald Diswinka, Canada

LIST OF PARTICIPANTS

On the following pages are the names and addresses of each of the participants.

A further listing of workshop groups begins on page 224.

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WORKSHOP GROUP 1

Forrest Bear (MN)	T - 10:45	(Reactor Chairman)
	W - 10:45	(Reactor Panel)
Tim Claus (MN)	T - 11:10	(Reactor Panel)
Dale Drees (MN)	T - 11:10	(Reactor Panel)
Jim Guilinger (IL)	T - 11:10	(Reactor Panel)
Don Ward (MO)	T - 11:10	(Reactor Panel)
Larry Hodel (IL)	M - 10:00	(Speaker)
	T - 1:40	(Topic Chairman)
Walter Nechville (WI)	M - 2:15	(Panel Member)
Larry Statler (IA)	M - 9:10	(Speaker)
Bene Windsor (IL)	M - 3:50	(Topic Chairman)
Bob Wolff (IL)	T - 9:15	(Session Chairman)

WORKSHOP GROUP 2

Paul Aakre (MN)	T - 2:05	(Reactor Panel)
Donald Ahrens (IA)	W - 9:45	(Panel Member)
Mervin Bettis (MO)	M - 3:50	(Topic Chairman)
Rollan Bonneau (IL)	M - 10:15	(Speaker)
	W - 10:45	(Reactor Panel)
Ed Breece (IL)	T - 10:45	(Topic Chairman)
	T - 10:05	(Reactor Panel)
Harry Hoerner (IL)	T - 2:05	(Reactor Panel)
Tom Hoerner (IA)	M - 1:45	(Session Chairman)
William Rick (IA)	M - 2:15	(Panel Member)
Marshall Finner (WI)	T - 1:40	(Reactor Chairman)
	T - 2:05	(Reactor Panel)

WORKSHOP GROUP 3

Roger Beck (IA)	M - 3:50	(Topic Chairman)
Vic Bekkum (IA)	M - 3:05	(Reactor Panel)
	T - 1:40	(Topic Chairman)
Hubert Helmkamp (IL)	M - 3:05	(Reactor Panel)
Gordon Jindra (MN)	M - 3:05	(Reactor Panel)
Howard Johnson (IA)	M - 3:05	(Reactor Panel)
Phil Lane (MN)	M - 10:45	(Speaker)
Richard Linhardt (MO)	T - 10:45	(Topic Chairman)
	W - 9:45	(Panel Member)
Ron Williams (IL)	W - 11:30	(Speaker)

WORKSHOP GROUP 4

Jack Bailiff (IA)	T - 10:45	(Topic Chairman)
Dean Byerly (IA)	W - 8:40	(Session Chairman)
Ron Della Croce (IA)	M - 3:50	(Topic Chairman)
Brian Hare (Canada)	T - 1:10	(Session Recorder)
Bill Hoffman (MN)	T - 9:25	(Panel Member)
Jerome Nechville (WI)	T - 1:40	(Topic Chairman)
Howard Turner (GA)		
Gerry Vanderloop (WI)	T - 10:05	(Reactor Panel)

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WORKSHOP GROUP 5

David Cattron (IL)	M - 3:50	(Reactor Panel)
Craig Morton (MO)	W - 9:25	(Reactor Panel)
Kent Freberg (MN)	T - 1:40	(Topic Chairman)
Lou Hathaway (IL)	W - 11:50	(Reactor)
William Hires (MO)	T - 10:45	(Topic Chairman)
Don Hoover (IA)	T - 10:45	(Session Recorder)
Phillip Martinson (IA)	W - 10:45	(Reactor Panel)
Dwight Mobley (IL)	W - 9:25	(Reactor Panel)
Larry Munton (IL)	M - 11:45	(Reactor Panel)
Cletus Fontaine	M - 4:15	(Reactor Panel)

WORKSHOP GROUP 6

Larry Case (MO)	M - 2:15	(Panel Member)
	W - 10:45	(Reactor Panel)
Marvin Case (WI)	T - 1:00	(Reactor Panel)
Harold Gates (IL)	T - 1:00	(Reactor Panel)
Francis Hethcote (IA)	T - 1:00	(Reactor Panel)
Robert Krumwiede (MN)	T - 9:25	(Panel Member)
Joe Poulter (IL)	M - 10:15	(Speaker)
	T - 1:40	(Topic Chairman)
Edgar Scherich (IA)	T - 10:45	(Reactor Chairman)
John Spuller (IL)	M - 11:00	(Speaker)
Harold Stogsdill (IL)	T - 1:00	(Reactor Panel)
Henry Torkelson (IA)	M - 3:50	(Topic Chairman)

WORKSHOP GROUP 7

Lanny Anderson (IL)	M - 2:15	(Panel Member)
Eldon Chapman (IL)	M - 3:50	(Topic Chairman)
Roger Hansen (IA)	T - 3:00	(Reactor Panel)
Reed McCulloh (IA)	M - 11:15	(Speaker)
Ronald McNett (WI)	M - 3:50	(Session Recorder)
Gary McVey (MN)	T - 1:40	(Reactor Chairman)
Paul Rameker (WI)	T - 3:00	(Reactor Panel)
William Shreck (IL)	M - 11:45	(Reactor Panel)
	T - 10:45	(Topic Chairman)
George Stanek (MO)	T - 3:00	(Reactor Panel)

WORKSHOP GROUP 8

Perry Brooks	T - 10:45	(Reactor Panel)
Gary Hendrickson	M - 11:15	(Speaker)
Harold Crawford (IA)	M - 1:55	(Speaker)
William Doerr (IL)	T - 1:40	(Topic Chairman)
	W - 12:30	(Observations)
Larry Korte (IL)	T - 10:05	(Reactor Panel)
Vic Lundy (IA)	W - 9:25	(Reactor Panel)
William Ryden (MN)	T - 10:45	(Topic Chairman)
Don Schwartz (WI)	M - 3:50	(Topic Chairman)
	W - 8:45	(Panel Member)
John Votca (MN)	W - 8:45	(Panel Member)

WORKSHOP GROUP 9

Ronald Anderson (WI)	T - 10:45	(Topic Chairman)
Roland Espenschied (IL)	W - 11:50	(Reactor)
James Frisby (MO)	M - 2:15	(Panel Member)
Ralph Hanes (IL)	T - 9:25	(Panel Member)
William Hohenhaus (MN)	W - 9.:45	(Panel Member)
Steven Johnson (IL)	T - 1:40	(Topic Chairman)
Allen Linster (WI)	W - 8:45	(Panel Member)
Dale Parker (IA)	M - 11:45	(Reactor Panel)
Ken Ross (IA)	T - 10:05	(Reactor Panel)
Ken Drollinger (IL)	M - 3:50	(Topic Chairman)

WORKSHOP GROUP 10

Richard Loberger (WI)	T - 10:45	(Topic Chairman)
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Harry Pry (MO)	M - 4:15	(Reactor Panel)
Dale Sanderson (MN)	M - 4:15	(Reactor Panel)
Duane Schindler (WI)	M - 3:50	(Reactor Chairman)
Dan Schwitters (IA)	M - 11:15	(Speaker)
	T - 1:40	(Topic Chairman)
George Shorter (IL)	T - 1:40	(Session Recorder)
Harold Swanson (IA)	W - 9:25	(Reactor Panel)
Brian Telander (IL)	W - 8:45	(Panel Member)

CONFERENCE AGENDA

The schedule of sessions is reproduced on the following pages to give the reader a better perspective of how the conference was scheduled and organized.

7:30 Departure time — Chartered buses transport attendees to Deere & Company

8:00 Registration, coffee and get acquainted (display floor)

8:30 Assemble in auditorium

AUDITORIUM

8:55 **Greetings by Conference Chairman** (Louis Hathaway, Managing Editor, Service Training, Deere & Company)

9:00 **Welcome address** (Robert A. Hanson, President and Chief Executive Officer, Deere & Company)

9:10 **Keynote addresses — Goals of conference —** joint presentation by John Conrads, General Service Manager, Deere & Company and Larry Statler, Assistant Dean & Farm Manager, Kirkwood Community College, Iowa

INDUSTRY'S ROLE IN AG MECHANIZATION EDUCATION

9:40 **Session Introduction** (Session Chairman, Louis Hathaway)

9:45 **The Challenge of Providing Good Customer Service** (Robert Sohl, Director of Service, Deere & Company)

10:00 **Teacher Training Opportunities in Industry** (Larry Hodel, Service Manager, Agricultural Products, — John Deere Company, Illinois)

10:15 **Industry's Assistance in Recruiting Students** (Joe Poulter, John Deere Dealer, Illinois, and Rollan Bonneau, Chairman, Ag Division, Kishwaukee Community College, Illinois)

10:30 **Coffee Break**

10:45 **Assemble in auditorium**

10:50 **Availability of Hands-on-training Components (hardware)** (Phil Lane, Division Service Manager, John Deere Company, Minnesota)

11:05 **Availability of Teaching Aids (software)** (John Spuller, Manager, Service Training, Deere & Company, Illinois)

11:20 **Further Involvement of Industry** (Dan Schwitters, John Deere Dealer, Iowa; Reed McCulloh, Area Service Manager, John Deere Company, Illinois; and Gary Hendrickson, Service Manager, John Deere Company, Missouri)

11:50 **Reactor's Panel Response**
Reactors:
- *Dale Parker, Assistant Professor, Ag Power and Diesel Mechanics, Iowa Western Community College*
- *Larry Munton, Director, Mechanical Power Technology, Black Hawk College-East*
- *William Schreck, Head Consultant, Illinois State Staff, Agricultural Occupations*

12:05 **Depart for Sheraton via buses**

12:30 Lunch — Sheraton (Robinson Room)

1:15 Vocation Education in Germany (F. K. Otto, Secretary, German Training Centers of Agricultural Engineering, Darmstadt, Germany)

1:30 Adjourn Lunch

TEACHERS FOR QUALITY AG MECHANICS INSTRUCTIONAL PROGRAMS (Cotillion Room)

1:45 Session Introduction (Session Chairman — Tom Hoerner, Professor, Ag Engineering and Ag Education, Iowa State University)

1:55 The Quality Ag Mechancis Instructor (Harold Crawford, Assistant Dean, College of Agriculture; Ag Education Department Head, Iowa State University)

2:15 Recruiting and Providing Quality Post-Secondary Instructors. Panel Discussion Topics:

1. Education requirements for instructors in Ag Mechanics programs. *(Larry Case, State Director, Ag Education, Missouri)*

2. Technical competence requirements for instructors *(Victor Bekkum, Assistant Professor, Ag Education, Iowa State University)*

3. Where should instructors come from — background experiences *(Lanny Anderson, Professor of Agriculture, Black Hawk College, Illinois)*

4. How do you recruit competent instructors? *(William Rich, Division Chairman, Ag Department, North Iowa Area Community College)*

5. What do you look for in Ag Mechanics instructors, basic qualifications. *Walter Nechville, Instructor, Ag Mechancis, District One Technical Institute, Wisconsin)*

3:05 Reactors' Panel Response

- Reactor to Topic No. 1 — *Gordon Jindra, Instructor, Ag Business, Mankato Area Vocational Tech Institute, Minnesota*
- Reactor to Topic No. 2 — *Jim Frisby, Professor, Ag engineering, University of Missouri*
- Reactor to Topic No. 3 — *Hubert Helmkemp, Machinery Instructor, Black Hawk College, Illinois*
- Reactor to Topic No. 4 — *Howard Johnson, Professor and Head, Ag Engineering Dept., Iowa State University*
- Reactor to Topic No. 5 — *Dwight Mobley, Dept. Chairman, Ag Mechanics, Wabash Valley College, Illinois*

3:30 Coffee Break

WORKSHOP SESSIONS

3:45 Workshop (WS) Activity Introduction (Tom Hoerner, Session Chairman)

3:50 DISCUSSION GROUPS begin their activity.

Keeping Post-Secondary Instructors Technically and Educationally Competent

Topics and Issues

1. **Industry's role in keeping instructors technically and educationally competent** (WS Group 1 meet in the Hawkeye Suite) (WS Group 6 meet in the Robinson room) (Group 1 Chairman — Bene Windsor, Instructor, Ag Mechanics, Carl Sandburg College, Illinois) (Group 6 Chairman — Henry Torkelson, Instructor, Ag Power and Machinery, Iowa Lakes Community College)

2. **University's role in keeping instructors technically and educationally competent** (WS Group 2 meet in the Robinson Room) (WS Group 7 meet in the Cotillion Room) (Group 2 Chairman — Mervin Bettis, Associate Professor, Ag Education, Northwest Missouri State University) (Group 7

Chairman — Eldon Chapman, President IAVAT, Vo-Ag Instructor, Herscher High School, Illinois)

3. **Post-Secondary school's role in keeping instructor's technically and educationally competent** (WS Group 3 meet in the Illini Suite) (WS Group 8 meet in the Badger Suite) (Group 3 Chairman — Roger Beck, Ag Dept. Head, Hawkeye Institute of Technology, Iowa) (Group 8 Chairman — Don Schwarz, Dean, Agribusiness, Milwaukee Area Technical College, Wisconsin)

4. **The ag mechanics instructor's role in keeping technically and educationally competent** (WS Group 4 meet in the Robinson Room) (WS Group 9 meet in the Cotillion Room) (Group 4 Chairman — Ron Della Croce, Dept. Chairman, Trades & Industrial Education, Iowa Lakes Community College) (Group 9 Chairman — Ken Drollinger, Instructor, Ag Mechanics, Lakeland College, Illinois)

WS Groups 5 & 10 contain the reactor panel and should discuss all four topics to prepare for response to workshop reports. (Meet in the Captain Bufford Room) (Reactor Chairman — Duane Schindler, Instructor, Ag Mechanics, District One Technical Institute, Wisconsin) (Reactors' panel listed at 4:15)

WS Session Recorder: Ronald Mcnett, Instructor, Ag Mechanics, Southwest Wisconsin Voc-Tech Institute

4:10 Workshop Discussion Groups Prepare Summary Report

MONDAY AFTERNOON
1 November — Sheraton

4:15 GROUP REPORTS (Cotillion Room)

Keeping Post-Secondary Instructors Technically and Educationally Competent

Topic No. 1 — **Industry's role in keeping instructors technically and educationally competent** (WS Groups 1 & 6)

Topic No. 2 — **University's role in keeping instructors technically and educationally competent** (WS Groups 2 & 7)

Topic No. 3 — **Post-Secondary school's role in keeping instructors technically and educationally competent** (WS Groups 3 & 8)

Topic No. 4 — **The ag mechanics instructor's role in keeping technically and educationally competent** (WS Groups 4 & 9)

4:55 Reactors' Panel Response (Four individuals from WS Groups 5 & 10)

- Reactor to Topic No. 1 — *Cletus Fontain, Ag Education Consultant, Wisconsin Board of Vocational & Technical Adult Education*
- Reactor to topic No. 2 — *David Cattron, Instructor, Ag Mechanics, Joliet Junior College, Illinois*
- Reactor to Topic No. 3 — *Harry Pry, Professor of Agriculture, Dept. of Agriculture, Southeast Missouri State University*
- Reactor to Topic No. 4 — *Dale Sanderson, Instructor, Ag Mechanics, Staple Technical Institute, Minnesota*

5:15 Adjourn

8:30 Coffee

8:50 Assemble in Cotillion Room

8:55 Session Opens (Louis Hathaway)

9:05 Welcome (Willard L. Stowell, Director Sales Branches, Deere & Company)

CURRICULA — GOALS AND PROBLEMS

9:15 Session Introduction (Session Chairman — Bob Wolff, Associate Professor, School of Agriculture, Southern Illinois University)

9:25 Personal Viewpoint of Curricula (panel)

1. John Deere (Ralph Hanes, Service Training Manager, John Deere Co., Illinois)
2. John Deere Dealer, Bill Hoffman, Minnesota)
3. Instructor (Robert Krumwiede, Assistant Professor and Chairman, Ag Industries and Services, University of Minnesota Technical College)
4. Ag Mechanic Graduate (David Jones, Mechanic, John Deere Harvester Works, Illinois)

10:05 Reactors' Panel Response

- Reactor to Item No. 1 — *Larry Korte, Instructor, Ag Mechanics, Danville Area Community College, Illinois*
- Reactor to Item No. 2 — *Ken Ross, Instructor, Ag Mechanics, Des Moines Area Community College, Iowa*
- Reactor to Item No. 3 — *Perry Brooks, Instructor, Vo-Ag, Columbia area Career Center, Missouri*
- Reactor to Item No. 4 — *Gerry Vanderloop, Instructor, Ag Mechanics, Moraine Park Technical Institute, Wisconsin*

10:25 Coffee Break

WORKSHOP SESSIONS

10:40 Workshop Activity Introduction (Bob Wolff)

10:45 **DISCUSSION GROUPS (1, 2, 3, 4 & 5) begin their activity

Curricula in the Secondary School — Part 1

Workshop

(WS Groups 1, 2, 3, 4 & 5)

Topics and Issues

1. **What should the Ag Mech curriculum at the secondary school include?** (WS Group 2 meet in the Hawkeye Room) (Topic Chairman — Ed Breece, Professor and Chairman, Dept. of Agriculture, Western Illinois University)
2. **What knowledge and skills should secondary school students develop?** (WS Group 3 meet in the Robinson Room) (Topic Chairman — Richard Lindhardt, Associate Professor, Ag Education Dept., University of Missouri)
3. **What are the major problems associated with the secondary school Ag Mech program?** (WS Group 4 meet in the Illini Room) (Topic Chairman — Jack Bailiff, Instructor, Ag Power, Hawkeye Institute of Technology, Iowa)
4. **How can industry and the secondary school cooperate to correct problems so that the results are beneficial to all — the secondary school, industry, and student?** (WS Group 5 meet in the Badger Room) (Topic Chairman — Bill Hires, Assistant Professor, Ag Dept., University of Missouri)

****NOTE SIMULTANEOUS ACTIVITY**

At **10:45** Groups 1, 2, 3, 4 & 5 begin discussion of *Curricula in the Secondary School,* and Groups 6, 7, 8, 9 & 10 begin discussion of *Curricula in the Post-Secondary School.* See page 10.

WS Group 1 contains the reactor panel and should discuss all four topics to prepare for response to workshop reports. (WS Group 1 meet in the Cotillion Room) (Reactor Chairman — Forrest Bear, Professor, Ag Engineering and Education, University of Minnesota) (Reactors' Panel listed at 11:10)

WS Session Recorder — Don Hoovr, Instructor, Farm Equipment, Trades & Industry Dept., Iowa Lakes Community College

10:45 **DISCUSSION GROUPS (6, 7, 8, 9 & 10) begin their activity

Curricula in the Post-Secondary School
Part 2 Workshop

(WS Groups 6, 7, 8, 9 & 10)

Topics and Issues

1. **What should the Ag Mech curriculum in the post-secondary school include?** (WS Group 7 meet in the Robinson Room) (Topic Chairman — William Schreck, Head Consultant, Illinois State Staff, Agricultural Occupations)
2. **What knowledge and skills should post-secondary students develop?** (WS Group 8 meet in the Robinson Room) (Topic Chairman — William Ryden, Assistant Executive Vice President, Farm Equip. Assoc. of Minnesota and South Dakota)
3. **What are the major problems associated with the post-secondary Ag Mech program?** (WS Group 9 meet in the Captain Bufford Room) (Topic Chairman — Ronald Anderson, District Director, Southwest Wisconsin Vocational-Technical Institute)

****NOTE SIMULTANEOUS ACTIVITY**

At **10:45** Groups 1, 2, 3, 4 & 5 begin discussion of *Curricula in the Secondary School,* and Groups 6, 7, 8, 9 & 10 begin discussion of *Curricula in the Post-Secondary School.* See page 9.

TUESDAY MORNING
2 November — Sheraton

4. **How can industry and the post-secondary schools cooperate to correct defined probems so that the results are beneficial to the community — school, industry and students in Ag Mech?** (WS Group 10 meet in the Captain Bufford Room) (Topic Chairman — Richard Loberger, Professor of Ag Engineering, University of Wisconsin, Platteville)

WS Group 6 contains the reactor panel and should discuss all four topics to prepare for response to workshop reports. (WS Group 6 meet in the Cotillion Room) (Reactor Chairman — Edgar Scherich, Associate Dept. Head, Ag Mechanics, Kirkwood Community College, Iowa) (Reactors' Panel listed at 1:00)

WS Session Recorder — Ray Nedved, Instructor Ag Power, Ag Dept., North Iowa Community College

11:05 Workshop discussions groups prepare summary report

11:10 GROUP REPORTS (Cotillion Room)

Curricula in the Secondary School

Part 1

Topic No. 1 — **What should the Ag Mech curriculum at the secondary school include?** (WS Group 2)

Topic No. 2 — **What knowledge and skills should secondary school students develop?** (WS Group 3)

Topic No. 3 — **What are the major problems associated with the secondary Ag Mech program?** (WS Group 4)

Topic No. 4 — **How can industry and the secondary schools cooperate to correct defined problems so that the results are beneficial to all — the secondary school, industry and students?** (WS Group 5)

TUESDAY MORNING
2 November — Sheraton

Reactors' Panel Response (Four individuals from WS Group 1)

- Reactor to Topic No. 1 — *Dale Drees, Instructor, Vo-Ag, Southland High School, Iowa*
- Reactor to Topic No. 2 — *Jim Gullinger, Instructor, Vo-Ag, Sycamore High School, Illinois*
- Reactor to Topic No. 3 — *Don Ward, Instructor, Ag Mechanics, Chillicothe Area Vo-Tech School, Missouri*
- Reactor to Topic No. 4 — *Tim Claus, Service Training Manager, John Deere Company, Minnesota*

11:55 Lunch

12:30 Vocational Education in Canada (Gerald Diswinka, Chairman, Assiniboine Community College, Manitoba, Canada)

TUESDAY AFTERNOON
2 November — Sheraton

12:55 Session Introduction (Session Chairman — Bob Wolff)

1:00 GROUP REPORTS (Continued) (Cotillion Room)

Curricula in the Post-Secondary School
Part 2

Topic No. 1 — **What should the Ag mech curriculum in the post-secondary school include?** (WS Group 7)

Topic No. 2 — **What knowledge and skills should post-secondary students develop?** (WS Group 8)

Topic No. 3 — **What are the major problems associated with the post-secondary Ag Mech program?** (WS Group 9)

Topic No. 4 — **How can industry and the post-secondary schools cooperate to correct defined problems so that the results are beneficial to the community — school, industry and students in Ag Mech?** (WS Group 10)

Reactors' Panel Response (Four individuals from WS Group 6)

- Reactor to Topic No. 1 — *Marvin Case, Instructor, Ag Dept., Southwest Wisconsin Voc-Tech Institute*
- Reactor to Topic No. 2 — *Harold Gates, Instructor, Ag Mechancis, Kishwaukee College, Illinois*
- Reactor to Topic No. 3 — *Francis Hethcote, Instructor, Ag Mechanics, Southwestern Community College, Iowa*
- Reactor to Topic No. 4 — *Harold Stogsdill, Instructor, Ag Mechancis, Lincoln Land Community College, Illinois*

1:40 *DISCUSSION GROUPS (1, 3, 4 & 5) begin their activity

Curricula in the University — Part 3 Workshop (WS Groups 1, 3, 4 & 5)

Topics and Issues

1. **What should the Ag mech curriculum at the University include?** (WS Group 3 meet in the Captain Bufford Room) (Topic Chairman — Victor Bekkum, Assistant Professor, Ag Education, Iowa State University)
2. **What knowledge and skills in Ag Mech should University students develop?** (WS Group 4 meet in the Hawkeye Room) (Topic Chairman — Jerome Nechville, Instructor, Ag Engineering Technology, University of Wisconsin, River Falls)
3. **What are the major problems associated with the University Ag Mech program?** (WS Group 5 meet in the Illini Room) (Topic Chairman — Kent Freberg, Assistant Professor, Mechanized Ag, University of Minnesota, Crookston)
4. **How can industry and the University cooperate to correct defined problems so that the results are beneficial to the University, industry and students?** (WS Group 1 meet in the Robinson Room) (Topic Chairman — Larry Hodel, Service Manager, John Deere Company, East Moline, Illinois)

WS Group 2 contains the reactor panel and should discuss all four topics to prepare for response to workshop reports. (WS Group 2 meet in the Cotillion Room) (Reactor Chairman — Marshall Finner, Professor, Ag Engineering Dept., University of Wisconsin, Madison) (Reactors' Panel listed at 2:05)

WS Session Recorder — Brian Hare, Service Training Manager, John Deere, Ltd., Grimsby, Canada

INTERFACING AND ON-THE-JOB TRAINING

1:40 *DISCUSSION GROUPS (6, 8, 9 & 10) begin their activity

Benefits of Interfacing Secondary School, Post-Secondary School and University Ag Mechanic Programs (WS Groups 6, 8, 9 & 10)

Topics and Issues

1. **Explore the benefits of interfacing secondary school, post-secondary school, and University Ag Mech programs.** (WS Group 8 meet in the Captain Bufford Room) (Topic Chairman — William Doerr, Assistant Dean, Agriculture, and Assistant Professor, Ag Education & Mechanization, Southern Illinois University)
2. **Where is on the job training in Ag Mech needed and beneficial?** (WS Group 9 meet in the Robinson Room) (Topic Chairman — Steven Johnson, Professor, Ag Mechanics, Illinois Central College)
3. **What are the major problems associated with on-the-job Ag Mech training programs?** (WS Group 10 meet in the Badger Room) (Topic Chairman — Dan Schwitters, John Deere Dealer, Iowa)
4. **How can schools and industry work cooperatively to resolve problems associated with on-the-job training?** (WS Group 6 meet in the Robinson Room) (Topic Chairman — Joe Poulter, John Deere Dealer, Illinois)

***NOTE SIMULTANEOUS ACTIVITY**

At **1:40** groups 1, 3, 4 & 5 begin discussion of *Curricula in the University,* and groups 6, 8, 9 & 10 begin discussion of *Benefits of Interfacing.*

WS Group 7 contains the reactor panel and should discuss all four topics to prepare for response to workshop report. (WS Group 7 meet in the Cotillion Room) (Reactor Chairman — Gary McVey, Chairman, Ag Division, University of Minnesota, Crookston) (Reactors' Panel listed at 3:00)

WS Session Recorder — George Shorter, Assistant Professor, Ag Engineering Dept., Western Illinois University

2:00 Workshop Discussion Groups Prepare Summary Report

2:05 GROUP REPORTS (Cotillion Room)

Curricula in the University

Part 3

Topic No. 1 — **What should the Ag Mech curriculum at the University include?** (WS Group 3)

Topic No. 2 — **What knowledge and skills in Ag Mech should University students develop?** (WS Group 4)

Topic No. 3 — **What are the major problems associated with the University Ag Mech program?** (WS Group 5)

Topic No. 4 — **How can industry and the University cooperate to correct defined problems so that the results are beneficial to the University, industry and students?** (WS Group 1)

Reactors' Panel Response (Four individuals from WS Group 2)

- Reactor to Topic No. 1 — *Paul Aakre, Instructor, Mechanized Agriculture, University of Minnesota, Crookston*
- Reactor to Topic No. 2 — *Harry Hoerner, Professor, Dept. of Agriculture, Western Illinois University*
- Reactor to Topic No. 3 — *H. Edward Breece, Professor and Chairman, Dept. of Agriculture, Western Illinois University*

- Reactor to Topic No. 4 — *Marshall Finner, Professor, Ag Engineering Dept., University of Wisconsin, Madison*

2:45 Coffee Break

3:00 GROUP REPORTS (Cotillion Room)

Benefits of Interfacing Secondary, Post-Secondary School and University Ag Mech programs.

Topic No. 1 — **Explore the benefits of interfacing secondary school, post-secondary school, and university Ag Mech programs.** (WS Group 8)

Topic No. 2 — **Where is on-the-job training in Ag Mech needed and beneficial?** (WS Group 9)

Topic No. 3 — **What are the major problems associated with on-the-job Ag mech training programs?** (WS Group 10)

Topic No. 4 — **How can schools and industry work cooperatively to resolve problems associated with on-the-job training?** (WS Group 6)

Reactors' Panel Response (Four individuals from WS Group 7)

- Reactor to Topic No. 1 — *Tom Hoerner, Professor, Ag Engineering and Ag Education, Iowa State University*
- Reactor to Topic No. 2 — *George Stanek, Instructor, Ag Mechanics, Three Rivers Community College, Missouri*
- Reactor to Topic No. 3 — *Roger Hansen, Instructor, Ag Mechanics, Western Iowa Tech Community College*
- Reactor to Topic No. 4 — *Paul Rameker, Instructor, Ag Mechanics, Moraine Park Technical Institute, Wisconsin*

3:40 Adjourn

TUESDAY EVENING
2 November — Deere & Company

5:00 Depart for Deere & Company via buses

5:45 Photo Session (Display floor)

6:15 Reception (Display floor)

7:00 Dinner (After Dinner Speaker — Curtis Tarr, Vice President, Management Development, Deere & Company)

9:00 Return to Sheraton via buses

WEDNESDAY MORNING
3 November — Deere & Company

7:35 Depart for Deere & Company via buses

8:15 Assemble in Auditorium

8:20 Session Opens (Louis Hathaway)

8:30 Welcome (Fred Thorne, Director Marketing Services, Deere & Company)

FUNDING — ALWAYS A CHALLENGE

8:40 Introduction to Session (Session Chairman — Dean Byerly, Instructor, Farm Implements, Northeast Iowa Technical Institute)

8:45 Post-Secondary Salaries and Staffing (panel of four people)

1. Funding Sources — *Allen Linster, Education Consultant, Wisconsin Board Vocational, Technical and Adult Education*

2. How Competitive Salaries Are Determined — *Don Schwarz, Dean, Agribusiness, Milwaukee Area Technical College, Wisconsin*

3. How Do We Keep Our Staff Up To Date — *John Votca, Director, Mankato Area Vo-Tech Institute, Minnesota*

4. What Factors Affect Equitable Teaching Load — *Brian Telander, Instructor, Ag Mechanics, Spoon River College, Illinois*

9:25 Reactors' Panel Response

- Reactor to Topic No. 1 — *Vic Lundy, Consultant, Instructional Services, State of Iowa Public Instruction*
- Reactor to Topic No. 2 — *Dwight Mobley, Dept. Chairman, Ag Mechanics, Wabash Valley College, Illinois*
- Reactor to Topic No. 3 — *Harold Swanson, Coordinator, Ag Occupations, Iowa Western Community College*
- Reactor to Topic No. 4 — *Craig Morton, Assistant Professor, Southwest Missouri State University*

9:45 Post-Secondary School Equipment and Facilities (panel of four people)

1. Sources of Funding — *William Hohenhaus, Post-Secondary Vocational Supervisor, Ag Occupations, Minnesota Dept. of Education*

2. What Are Facility and Equipment Needs — *Richard Lindhart, Associate Professor, Ag Education Dept., University of Missouri*

3. Staff Involvement in Planning — *Donald Ahrens, Manager, Prairie View Farms, Iowa (Formerly Coordinator, Ag Education Programs, District One Technical Institute, Wisconsin)*

10:25 Coffee Break

10:45 Reactors' Panel Response

- Reactor to Topic No. 1 — *Larry Case, State Director of Agricultural Education, Missouri State Dept. of Elementary & Secondary Education*
- Reactor to Topic No. 2 — *Forrest Bear, Professor, Ag Engineering and Education, University of Minnesota*
- Reactor to Topic No. 3 — *Phillip Martinson, Assistant Director, Vocational-Technical Education, Iowa Central Community College*

FUTURE CHALLENGES AND OPPORTUNITIES

11:05 Session Introduction (Louis Hathaway)

11:10 What's in Store from Industry? Robert Wismer, Director, Technical Center, Deere & Company)

11:30 How are educators going to cope with the future? (Ron Williams, President, Black Hawk College-East, Illinois)

11:50 Reactors' Panel Response (Rolland Espenschied, Professor, Dept. of Agriculture Engineering, University of Illinois) (Louis Hathaway, Managing Editor, Service Training Department, Deere & Company)

12:00 Lunch (Deere & Company East Cafeteria)

12:30 OBSERVATIONS one educator — William Doerr, Assistant Dean, Agriculture and Assistant Professor Ag Education & Mechanization, Southern Illinois University and one industry representative — John Conrads, General Service Manager, Deere & Company, to review conference — its success and its significance)

1:00 Remarks and Questions from participants

1:30 Adjourn Conference

1:45 Depart for airport and Sheraton via buses

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